MOTOR AGE

Chicago, August 14, 1913 **Ten Cents a Copy**

OLYMPIA Motor Truck Show

Complete report of annual exhibition in London. Late trends illustrated and described.

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Transcontinental motoring has produced many new ideas which tend to make traveling more comfortable for the tourist.

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Makers of American machines, trying out new product, find recent additions to motor family come up to expectations.

The Boston Starter

Eliminates the most annoying feature necessary to the operation of a gasoline car.

"THE BOSTON STARTER" eliminates the use of the starting crank.

The FORD Model "T" Car by its wonderful popularity has proved its claim to be called the Universal Car.

The FORD Model "T" Car equipped with a Boston Starter makes a combination of unequalled convenience and efficiency. Enter the list of contented owners of Ford Cars who have complete control of their cars sitting comfortably in the driver's seat.

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A few hours to install
No mechanical work required
No interference with use of crank
No change in appearance of car
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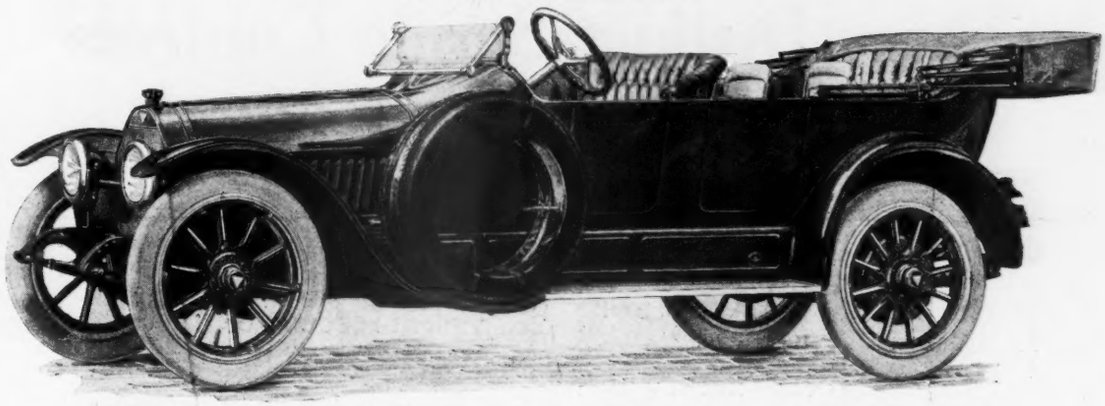
HUDSON SIX 54—$2250

SEVEN-PASSENGER



The New Ideal of a Distinguished Car

HERE now is a car which typifies the ideals of the time. This streamline body—this long, sloping hood—this absence of angle at the dash — this low-hung chassis — these crowned fenders—this placing of extra tires so the front doors are left clear—these things belong to the car of today.

The consensus of the world's best opinion is that this type of body marks the coming ideal car. These are radical changes but they are coming as surely as fore-doors came—and as suddenly.

All the best foreign cars—English, French and German—will this year exhibit exclusively this new streamline body. And all men know that what they adopt in body design becomes the world-wide vogue.

Our designers have added a hundred minor effects. They have Americanized—have Hudsonized—the type. So the car is distinctive. There will be no other just like it. But it embodies what we regard as the highest conception of the modern trend in bodies.

And we believe that every connoisseur will consider this new HUDSON Six the handsomest car exhibited.

Engineering Pauses

We can claim in this car no great advance as regards fine engineering and no HUDSON owner expects it. Fine engineering has limits. For the past four years Howard E. Coffin and his able engineers have given their best to the HUDSON. Last year they brought Sixes pretty close to perfection. So close that the HUDSON Six jumped in one year into the foremost rank among Sixes.

These men have worked out in this new-model car a vast number of minor engineering improvements. They have added scores of new mechanical features—some of them quite important. But we never expect to build a much better chassis than we built in our last year's Six.

This year's advances lie mainly in beauty, in comfort, in conveniences, in room. We have combined the best in lines, finish and equipment with the best in engineering. We have succeeded in making the HUDSON Six the masterpiece it is.

Now the Ideal Car

We now feel that this HUDSON 54 offers the utmost in every wanted feature. It has the staunchness of steel Pullmans. It has the comfort of Turkish lounging chairs. It has the speed of express trains. It is free from all the troubles which annoy the inexpert.

No man knows how to build a car more handsome and impressive. No conveniences are absent, no modern features lacking.

And all these things are here included in a Six 54, with seven-passenger body at the record price of $2250 (f. o. b. Detroit, Michigan).

The New Features

These are among the *new* features we bring out in this model. No mention is here made of the countless features in previous HUDSON models which we still retain.

Seven-passenger body.
135-inch wheelbase.
Left side drive. Right hand control.
36 x 4½-inch tires.
Extra tires carried—as never before—ahead of the front door. This leaves both front doors clear.
Four forward speeds.
Pure streamline body.
Low-hung body.
No angles at the dash.
Wide tonneau doors.
Gasoline tank in dash.
Electric self-cranking, with the rapid type of the Delco system built especially for this car.
Powerful electric lights with dimming attachment for city driving. They also act as ordinance lights.
Extra seats in tonneau fold into back of front seat, entirely out of the way.
Jeweled magnetic speedometer in dash, with new concealed noiseless gears.
Every operation and control placed within reach of the driver's hand. Gasoline and oil control, lights and starter.
Individual Yale lock on ignition control, prevents theft of car.
Rain-vision windshield built as part of the car.
Genuine Pantasote top. Curtains that are carried in the top can be instantly adjusted.
Electric horn—trunk rack—tire holders—license carriers—everything.

Go See It—Go Today

Go to the local HUDSON dealer and see this new achievement. It is not merely an improved car—it's a real innovation. It will display to you all the best thought of the day in automobile designing.

Go see it while it's new.
Our catalog on request.

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MOTOR AGE

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DEPARTMENTS

Vol. XXIV, No. 7 Chicago, August 14, 1913 $3.00 Per Year

GENERAL VIEW OF RECENT OLYMPIA TRUCK SHOW

Britons Profit by Truck Show

Olympia Attracts Many Colonial Visitors—Freak Designs Missing—Great Progress in Heavy Vehicle Construction

LONDON, Aug. 1—The heavy vehicle motor show at Olympia lasting from July 18 to 26, proved most successful, and the exhibitors are gratified with the public interest which was shown.

The heavy vehicle manufacturers of this country are of the opinion that a periodical exhibit of commercial vehicles is beneficial, and tends to advance the public interest, and indicates the great strides which are made from time to time in vehicles for the transportation of goods and passengers.

Colonials Show Interest

Another point which has added to the interest of the commercial vehicle show was the imperial motor transport congress which held its meetings during the period of the show. The congress was attended by representatives from all the British domains, and undoubtedly the delegates will return to their various countries very

By J. S. Critchley
M. I. Mech. E., M. I. A. E., and Geo. W. Watson, M. I. Mech. E., M. I. A. E.

much impressed with the capabilities of motor transport.

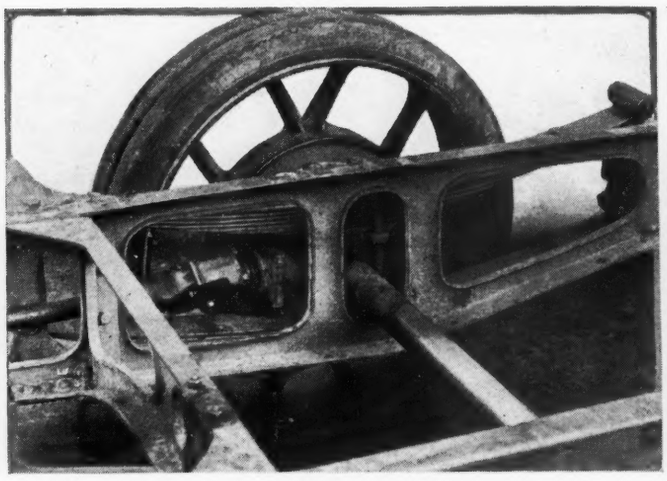
Further than this, many of the representatives came over with the serious intention of purchasing vehicles, and many arrangements for shipment to British possessions were fixed up during the show.

It cannot be said that the manufacturers in this country require a show by reason of lack of business. All the old established firms in this country are well supplied with orders, and to these the show is of no real material assistance. However, in the case of younger firms whose products have not yet stood the test of time the show undoubtedly is of benefit, especially in view of the large number of colonial visitors who are at present in this country.

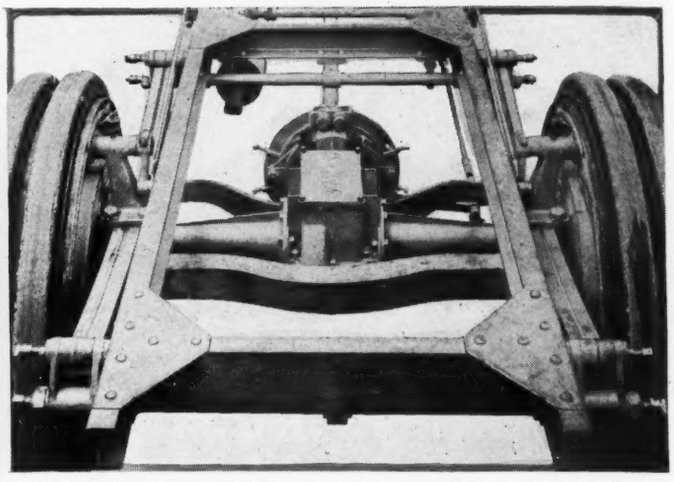
A perusal of the list of delegates who have attended the conference is convincing proof of the great move which is being made in our colonial possessions towards motor traction. The delegates represent the government, chambers of commerce, municipal corporations, government railways, boards of trade, fire brigades, trades associations, and many other important bodies from our over-seas dominions and colonies. In addition a large number of public bodies of this country were represented.

Olympia a Great Exhibition

Under these circumstances the Olympia industrial motor show can be counted as the most important of its kind ever held in this, or any other country, and it is difficult to foretell the far reaching benefits which will accrue from the gathering



AUSTIN LATTICE GIRDER FRAME AND DUPLEX SPRING SUSPENSION ABOVE AND BELOW THE AXLE



THE BERND 3½-TONNER SHOWING THE SOLID AXLE AND DIFFERENTIAL SHAFT DRIVE THROUGH INTERNAL GEARS

together of so many important representatives collected from all parts of the British empire.

From time to time the project of holding the heavy vehicle show has been discussed, to be run cojointly with the passenger car show, but the general opinion has been that if a heavy vehicle show is to be held it should be run at a separate time to the passenger car show, and given world-wide publicity. The organization therefore has fixed the time of the show to run concurrently with this important imperial motor transport conference.

Features of the Show

A tour of inspection among the various vehicle exhibits at Olympia revealed what tremendous developments have taken place in the motor transport world during the past 6 years. At the time of the previous show at Olympia in 1908, pedestrians in London, and other large cities in Great Britain were groaning because of the terrible noise and stench of ill-conceived, ill-designed and badly-operated motors. The engines, gears and axles of that day emitted the most fearsome and awesome sounds, and left a trail of foul-smelling vapor behind them long after they had passed a given point.

Today, all this has changed, and while there still is much room for improvement, it cannot be denied that British manufacturers, who, from the earliest days of motoring, have paid far more attention to the development of industrial vehicles than have our continental neighbors, have at last reached a stage of practical and economic development of motors for business purposes.

For a time, our manufacturers lagged behind other countries in the development of gasoline vehicles, but they were first in the field with steam wagons, and all along have maintained their lead, while in the design and construction of gasoline trucks they have made steady progress, and no finer examples of motor engineering skill can now be found than those turned out from the leading British works.

One of the most striking points of difference between the show of 1913 and that held in March, 1908, was the almost complete absence of double-deck motor-omnibuses. In 1908, every manufacturer with any pretense to importance in the trade, was making a bid for the motor-omnibus world. Today, a great many of them wish they had never touched it, for they have lost very heavily in their attempts to develop this class of public-service vehicles, which ultimately were left in the hands of a few men who had made a special study of the subject. The London General Omnibus Co. working in con junction with the Daimler Co., of Coventry, is producing practically all the motor buses needed for service in the British Isles, and are exporting to other countries in increasing number. The joint production of L. G. O. C. B type chassis and the Daimler-Knight motor bus chassis is approximately sixty per week.

Outside manufacturers, having realized the futility of influencing the motorbus business, have developed another class of passenger vehicle to a very high state of perfection, that is the large torpedo-type luxuriously finished chars-a-bancs, which are now immensely popular with pleasure parties. If one compares the modern char-a-bancs, with its clean and graceful lines, with the clumsy and unlovely productions of 5 years ago, one at once realizes the development which has taken place, not only in the construction of the machines, but in the evolution of body-work.

Slump in Taxicab Business

The taxicab business in London is undergoing something of a slump at the present time, and is slowly but surely going over into the hands of the owner-driver. It is not surprising, therefore, that taxicabs were not much in evidence at Olympia, but small vans, for loads of from 5 to 15 hundred weight, were to be seen in every part of the hall.

So rapid a progress has motor transport made in the past, that it is not too strong an assertion to say that, in the near future, even the smallest of trades men will be compelled to adopt modern methods of transport or give up business.

Development of Steam Wagons

In the matter of steam wagons, also, there has been much development, but not so many radical structural alterations have taken place during the past 5 years in this class of machine as with the gasoline vehicle. There were, however, a few machines in the hall that stood out clearly and call for attention. One of these was an Aveling and Porter vehicle, which had been borrowed from its owners, Schweppes, Limited, the aerated-water manufacturers, who now have a number of steamers of this make in service. This particular wagon, at first sight, could easily have been mistaken for a new machine, yet, as a matter of fact, it had been in continuous service from May 13, 1912, until a week before the show, when it was lent to the builders for the purposes of the exhibition. During the time it was in service, it ran 304 days, and covered 11,070 miles, doing in the meantime over 51,000 ton-miles of useful work, at a cost for repairs of 60 cents, an item of expenditure incurred by the driver, somewhat clumsily, standing upon and breaking an unsupported copper pipe. This information was given to one of the writers by Messrs. Schweppes' engineer.

There was a complete absence of freak designs among the engines staged at Olympia, or fitted to the various trucks and chassis. Design now has become, more or less, settled upon regular lines, and, although there still is much divergence of ideas upon many important details, particularly in regard to the cubic capacity of the cylinders in relation to the gross weight of the vehicle and the gear ratio, the general lines of design are now settled down to more or less uniform standard.

A few makers, particularly on the continent, still appear to like to tuck the engine away below the driver's footboards,

the idea being to retain a longer platform area for a given overall length, but users in this country do not consider that the advantage, due to the saving in overall length, is great enough to offset the undoubted disadvantage of having an inaccessibly placed engine. The writers would like to see a wider adoption of the Renault principle, as is exemplified on the truck chassis shown by the Austin Co. and Bayard, in both of which cases every part of the engine is most accessibly placed, neither the wings nor the radiator impeding the mechanic in the slightest degree.

The Austin engine is a very interesting one, and it may most easily be removed bodily from the chassis by the simple uncoupling of the fixing bolts, then pulling it out from the front of the chassis like a drawer. Austin is one of the very few among British builders that sticks to the separate cylinder construction, with a five-bearing crankshaft, but it is a matter of opinion entirely as to whether such a crankshaft is really necessary; the ordinary three-bearing type has given remarkably good accounts in hard service, and it is undoubtedly a cheaper form of construction.

Accessibility of Parts

One noticeable feature of the show was the evidence that accessibility of parts has been given more attention than it has in the past. To a certain extent, this is due to the published specifications of the British war department, which insists upon the provision of ample inspection covers in the crankcase and the inclosing of the valves and the magneto. The Maudslay engine is probably one of the finest British examples from the point of view of accessibility, but objections are raised, by operating engineers, to the use of the overhead camshaft. Overhead valves undoubtedly tend towards high thermal efficiency, but they involve the use of a double set of skew gearing with an intermediate vertical driving shaft, or a chain-drive from crankshaft to camshaft. If the former drive be adopted, backlash very quickly develops, while the chain-drive does not permit of the camshaft being swung back clear of the valves, in the manner adopted by the Maudslay company.

The general tendency now is to mount all the valves on one side of the engine, and operate them from a single camshaft; one notable exception to this rule among the Olympia exhibits, was the engine on the new 1½-ton model shown by Thornycrofts. This model has been evolved in consultation with the engineer responsible for the running of Pickfords fleet, the well known London carriers, who are among the largest users of commercial vehicles in this country. In this new Thornycroft the inlet valves are placed directly over the exhaust valves, but they are operated through vertical trip rods and overhead levers from the same camshaft which actuates the exhaust valves.

The Thornycroft Engine

This Thornycroft engine was the only four-cylinder engine in the show with a two-bearing shaft, the general lines of construction being similar to that which, we believe, has been widely adopted in the United States, but it is of much more sturdy construction than any of the American designs which we have seen, and we believe, in the future, it will be adopted more widely on this side.

Not many makers have adopted chains for driving the camshaft, most makers preferring either the ordinary type of spur gear or single helical gear, to insure silent running; on the whole, the straight spur gear, with steel pinion and bronze and fiber camshaft wheel, appears to give commercially satisfactory results. One of the difficulties in the way of the adoption of the chain-drive is the necessity for providing some form of adjustment to take up stretch or wear in the chain.

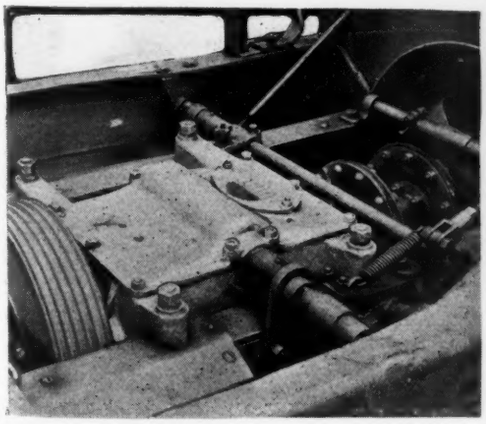
The Bayard company has overcome this in a very simple manner; it has mounted the magneto-pinion bearings in an eccentric housing and sleeve, the bracket which supports the magneto cast as an integral part of the housing, so that the alignment of the armature spindle and the timing wheel is not disturbed when adjustment for the chain is made.

Application of Chain-Drive

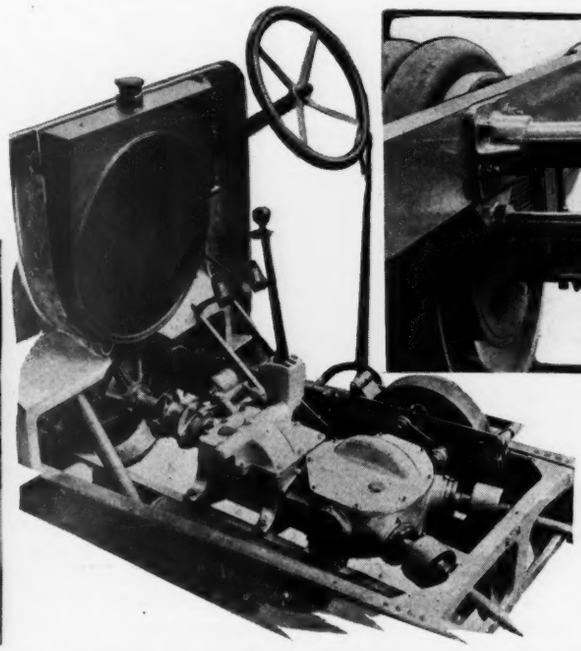
One other notable example of the chain-drive was that fitted to an Alldays truck chassis, which had a chain-drive from crankshaft to camshaft at the forward end, while the pump was mounted at the flywheel end of the engine, and was driven by a separate chain from a sprocket on the crankshaft. This arrangement has the advantage of admitting a very large diameter centrifugal pump, but it has the disadvantage of necessitating a very long suction pipe from the radiator.

Another departure from normal practice is that on the Milnes-Daimler engines, in which the timing gear is located between the third and fourth cylinders, the crankshaft having four bearings, with the timing pinion mounted on the crankshaft between the middle pair. This form of construction gives a cleaner and more symmetrical appearance to the engine than when the timing gear is at one end, and as the drive is transmitted to the camshaft at the middle, there is less tendency for lag of the cams furthest from the drive, but we consider the Milnes-Daimler people lay unnecessary stress upon this point.

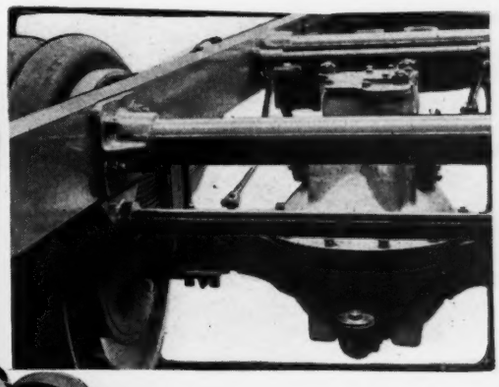
The 32-horsepower Albion engine was one of the most cleanly designed motors we have seen, and it has a remarkable absence of that pipiness which characterizes so many trucks. One of the distinctive features of this engine is, that the



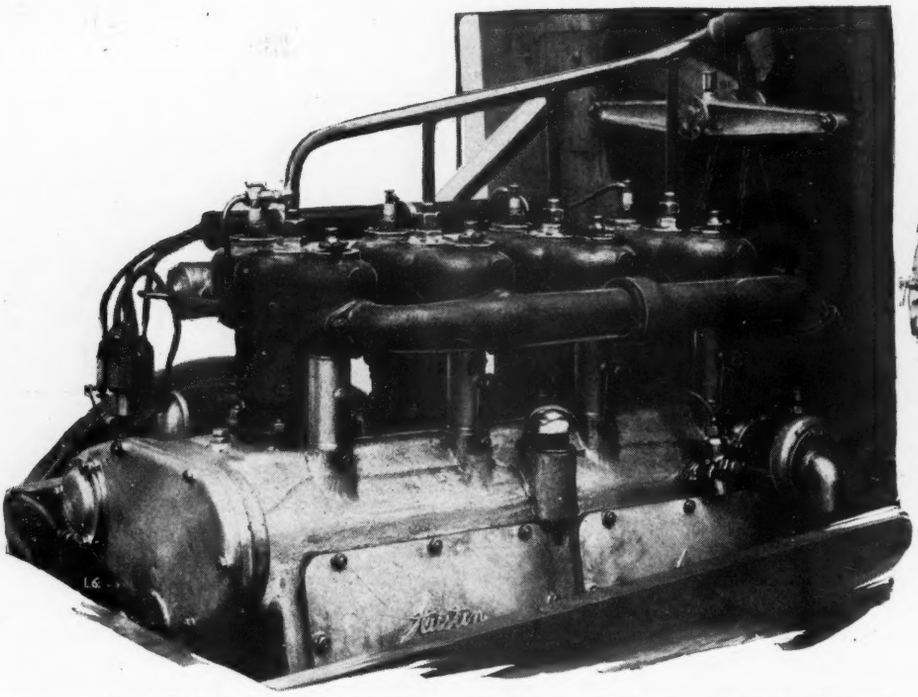
LEATHER COUPLINGS ON UNIC 2-TON TRUCK



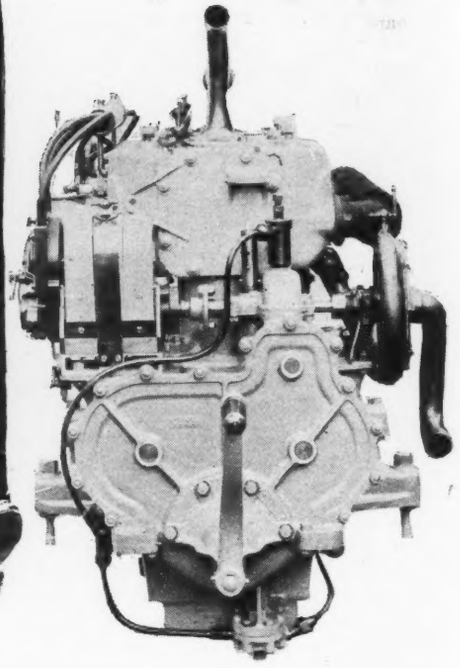
AUSTIN RADIATOR, CLUTCH, UNIVERSAL AND GEARBOX WITH DOUBLE PROPELLER SHAFTS, ONE TO EACH REAR WHEEL



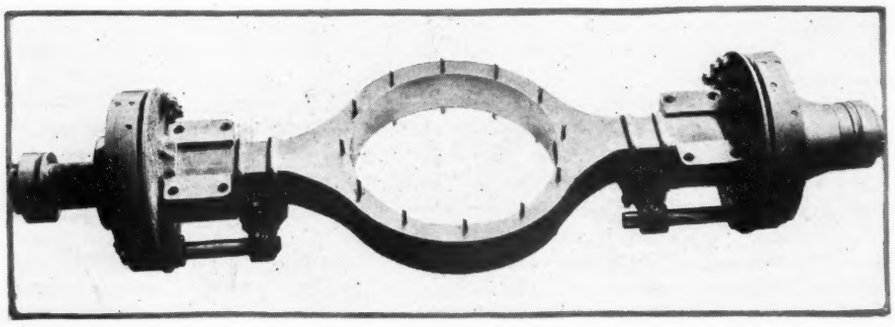
MAUDSLAY 5-TON TRUCK AXLE WITH DOUBLE REDUCTION GEARING



AUSTIN FOUR-CYLINDER TRUCK ENGINE, SHOWING METHOD OF INCLOSING VALVES ON THE MOTOR



FRONT VIEW OF THORNYCROFT 4½ BY 5-INCH ENGINE ON WAR OFFICE 4½-TON



AXLE FORGING FOR MAUDSLAY 1½-TON MODEL, ILLUSTRATING THE EXTREMELY RIGID AND HEAVY DESIGN

fan spindle is extended into the water-suction chamber, which is cast integral with the forward end of the waterjacket, and on the inner end of this spindle is mounted a centrifugal impeller for maintaining water circulation. There is thus only two pipe connections from engine to radiator, notwithstanding the fact that pump circulation is employed.

War Office Type of Truck

One of the largest, and certainly one of the best designed of truck engines in the show, was that fitted to the 4½-ton war office type chassis shown by Walker Bros., Limited, of the Pagefield Iron Works, Wigan. This engine has obviously been designed for particularly hard service, and on this engine the waterjackets are of more liberal proportions than on any other we have seen. Permanent provision has been made for the mounting and driving of an electric-lighting dynamo, for the purpose of illuminating the lamps or any advertisement signs which may be carried upon the vehicle. While one of the largest in the show, in proportion to its bore and stroke, it is certainly one of the lightest; it has four cylinders, cast in pairs, their diameter being 4¾ inches, while the piston stroke is 5½ inches.

Ball Bearings for Crankshafts

The use of ball bearings for crankshafts has not become very extensive, there being only a few examples of such methods of mounting among the exhibits, although in the Hallford chassis, in which ball bearings have been used from the first, very successful results have been obtained. In this country, operating engineers are very much alive to the necessity for effecting rapid repairs and overhauls, and one of the strongest arguments against the use of ball bearings is the fact that, although in some instances they do give long service, it is a matter of extreme difficulty to remove a ball bearing once it has been firmly secured to a crankshaft, and, unless it is firmly secured, creeping will quickly ensue. The forcible removal of these bearings, which is invariably difficult, is a risky operation, and large users fight shy of them, because of the danger of fracturing a shaft during the removal and replacement of a faulty bearing. The bearing most preferred, and most generally fitted, is the phosphor-bronze shell, with a thin white metal lining.

So far as lubrication is concerned, the forced type, with rotary pump feed to the main bearings through a hollow crankshaft, with splash lubrication to the gudgeon pins and cylinders, is the most generally adopted practice here, and that is the type fitted to most of the engines at the show. There does not appear to be any difficulty in getting lubrication up to the gudgeon pins and pistons, but there does appear to be a certain amount of difficulty in preventing too much oil splashing on to the cylinder walls, and, as a consequence, a number of makers are now cutting away the bottom part of the parting wall between adjacent pairs of cylinders, so that as one piston rises in the cylinder, instead of sucking entirely from the oil-spray filled chamber, it sucks a percentage of air and vapor from the adjacent cylinder. This has the effect of checking the rise of oil spray from the base chamber up to the pistons. Another means of overcoming excess of lubrication is the use of a scraper ring at the lower end of the piston.

Novel Form of Piston

The makers of the Dorman engine have resorted to a very novel form of piston, with the idea of avoiding over lubrication. The lower part of the piston is recessed, starting with a sharp shoulder and finishing off with a tapered portion. Very successful results have been obtained with this form of piston, which has duplex piston rings; these consist of a broad stout inner ring of the usual eccentric type, over which is placed a couple of smaller rings, made of equal section all around, and turned and ground to a true circle of the exact diameter of the cylinder, the slot

being only sufficiently wide to allow for expansion. The advantage claimed for this form of piston ring is that the outer rings bear evenly all around the cylinder.

Ignition Systems

High-tension magneto ignition now has entirely replaced the use of low-tension and battery-and-coil ignition, although the battery and coil, in some cases, is retained as an auxiliary. By far the larger number of the engines were fitted with Bosch magnetos, but there were a few examples of the more recently produced M. E. A. magneto, which has a bell-shaped magnet, in place of the more usual horseshoe type. The advantages claimed for this magneto is that, in all positions of advance and retard, the value of the spark is not affected in the least, because the construction allows of the relative positions of magnet and armature being simultaneously adjusted, thus insuring exactly the same strength and duration of the shaft at any position of the armature in relation to the firing point.

Among the engines fitted to the small models, was a twin-cylinder V type, on the Hillman 1,000-pound truck. In this engine the cylinders are arranged at an angle of 60 degrees, and each cylinder is provided with a separate Bosch high-tension magneto, both being driven from the same timing wheel. The reason that the designer has fitted two magnetos is that none of the standard magnetos, except the small cycle type, are suitable for giving a couple of strong sparks correctly timed for an engine with cylinders set at 60 degrees. Both the big-ends of this engine work on to the same crankpin, and this engine, whilst being cheaper to produce than one with two cylinders side by side, gives a torque nearly as good, from the commercial point of view, as a four-cylinder engine.

Clutches

The multiple-disk type of clutch is finding less favor in England now than it did some years ago. The plain cone type of clutch, covered with leather or some such material as ferodo or raybestos, is now the most popular type among our truck builders. In some instances, it is made of the inverted type, but in most cases the plain push-in cone, in which the necessary pressure is exerted by one or more helical springs, is adopted—an arrangement which lends itself to ready adjustment.

A further refinement which has become general, and which the experience of operating engineers has proved to be necessary, is the fitting of a flexible shaft between the clutch and the gearbox; not only is this shaft provided in order to relieve the individual units, of strains due to whipping of the frame, causing lack of alignment, but when this flexibly-jointed shaft is removed, the clutch may be dismantled for re-lining with a minimum of delay.

While realizing the necessity of fitting a flexible shaft at this portion of the transmission system, some manufacturers prefer not to have working joints, such as cardan blocks or similar devices, because of the noise they set up, and our builders are now relying more upon the flexibility of leather, spring steel, etc. The Daimler company, of Coventry, was one of the first builders to make use of leather for a cardan shaft joint, and it is interesting to note that the Unic company has adopted a joint of similar type between the clutch and gearbox of its new 2-ton chassis, while the Austin company also is using a joint of this type; but instead of the leather ring it fits a ring of spring steel, as may be seen in an inspection of the clutch, gearbox and differential box of the last named truck.

The large diameter plate clutch, as used by the de Dion company for some years past, or modifications of the same, also is used by a few makers, but not to any very large extent, the most-notable British user being the Albion company, which has evolved a clutch that works well, yet having once taken up the load hangs on to it with amazing tenacity.

Change-Speed Gearboxes

It was a remarkable fact that on not a single truck at Olympia was there a change-speed gear which could be considered of the freak order, and the only friction-driven machines in evidence were the light 600-pound Girling parcel-carriers and the small Globe delivery van for 800-pound loads, while all the other exhibits were provided with three-speed or four-speed gearboxes, three-speeds being generally considered sufficient for trucks up to 2½ tons capacity, while for greater loads four-speeds and reverse now is generally provided.

The sliding type, and the constant-mesh type with dog-clutch engagement, are the two forms which are finding most favor, and in all cases the selection is effected through a lever and gate-change quadrant operated by the driver's right hand, except in the case of the Austin and a couple of other makes, which have the change-speed gate quadrant mounted directly on the gearbox for operation by the driver's left hand. Commercial Cars, Limited, is the only manufacturer here providing for five-speeds and a reverse, such a box being fitted to that maker's 6-ton trucks, its specially low gear enabling a trailer to be drawn, in addition to the load carried, up gradients of exceptional severity.

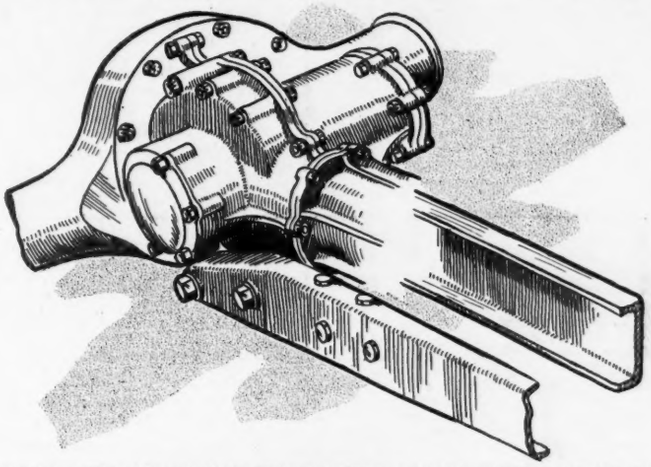
The gearbox on the Maudslay 3 to 4-tonner is a particularly good example of current practice among British builders. The chain-drive of gearbox has not made much headway, except for public-service vehicles, all the latest motor buses in London, and there are now something like 2,500 of the type in service, are provided with the chain-drive type, a typical example being that fitted on the Daimler bus chassis. In this gearbox an oil-drip tray is cast integral with the case.

It is difficult to get reliable data as to the relative costs of maintenance for gear type, as compared with chain-type gearboxes, but it is the claim of the London bus companies that the chain-drive gearbox, as compared with a gearbox of the type such as is used on the de Dion buses, may be maintained at one-third the cost of the latter's maintenance.

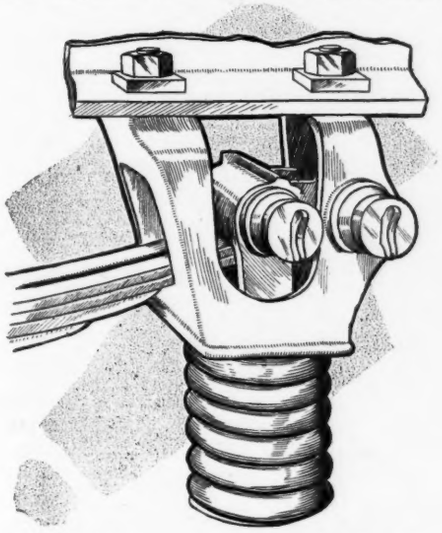
Final Drive

The demand for silent and clean-looking vehicles is having its effect upon the final-drive gearing of motor trucks in this country, and, to a certain extent, the specification of the war department, which has placed an embargo upon the chain-driven axles, has no doubt helped in bringing about the change from chain-drive to live-axle among heavier models; this change was one of the striking features of the show.

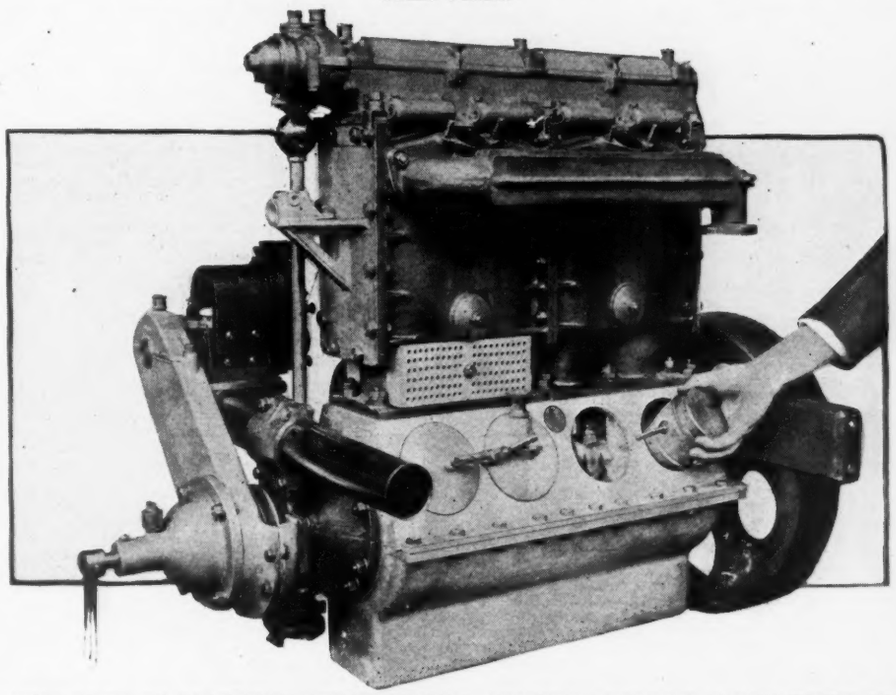
Manufacturers like J. & E. Hall, Thornycrofts, Walker Bros. and the Wolseley company, who hitherto have built only chain-



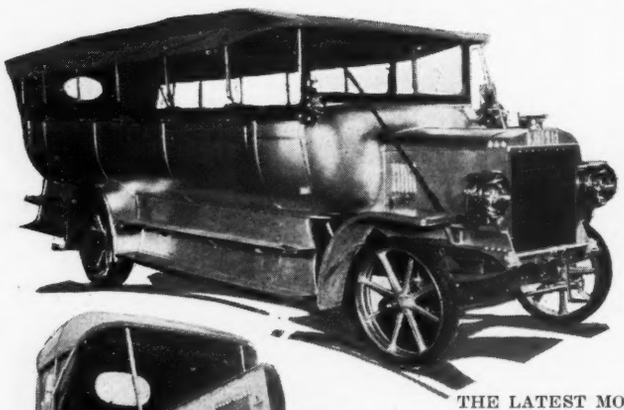
WOLSELEY REAR AXLE ON 4½-TON WAR OFFICE MODEL BEVEL GEAR FIRST; SPUR GEAR FINAL

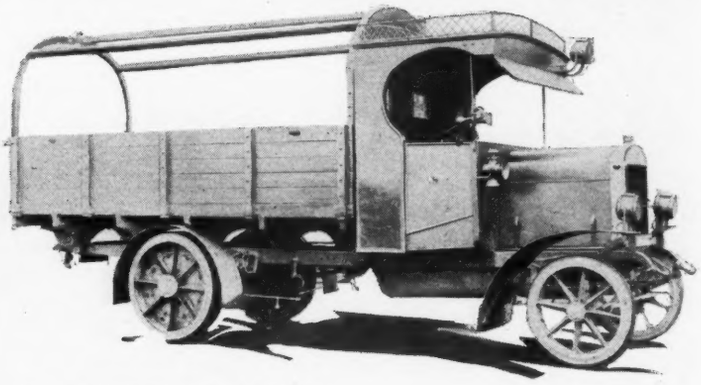


BUESSING SPRING SUSPENDED SHACKLE, SHOWING COIL SPRING AT BOTTOM

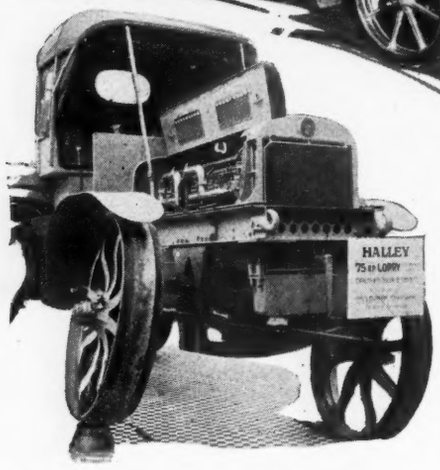


SIDE VIEW OF MAUDSLAY TRUCK ENGINE, SHOWING INCLOSED CHAIN DRIVE TO MAGNETO AND METHOD OF REMOVING PISTONS





THE LATEST MOTOR BUS; HARRIER CHAR-A-BANC
THORNYCROFT WAR OFFICE 4½-TON TRUCK WITH PRAIRIE SCHOONER TOP



HALLEY'S 75-HORSEPOWER TRUCK FOR SERVICE IN PATAGONIA

driven vehicles for loads in excess of 3 tons, now are all producing live-axle models, with cardan shaft drive. In some cases, the cardan shaft is inclosed in a tube, the forward end terminating in a spherical joint, which is anchored to a socket member on one of the transverse members of the frame, this tube acting both as torque and thrust member; while in other cases individual torque and thrust members are provided. There also are a number of machines, as, for instance, the 3-ton worm-driven Thornycroft, in which both torque and thrust are taken through the front half of the rear bearing springs, or, as in the case of the Maudslay vehicles, the torque is restrained by spring-compensated torque members, while the tractive effort is taken through the springs; in each of the two latter cases, of course, the front end of the rear springs is positively anchored to brackets on the frame.

Worm-Driven Rear Axles

The principle of the worm-drive has made great headway among British builders during the past few years, and now there are very few of them who do not produce at least one worm-driven model. With the exception of the Dennis company, however, none of our manufacturers uses the worm-drive for vehicles of greater load capacity than 3 tons, partly because of the war departments expressed preference for an axle in which bevel gearing is employed. Among the well-known manufacturers who have adopted the worm-drive, within the past 2 years, are: Commercial Cars, Limited; McCurd; Maudslay; Napier; Siddeley-Deasy; Sidney Straker & Squire (on all models); Thornycrofts (on a 2½-ton and 3-ton model); Tilling; and Wolseley. One of the best examples of worm-driven axles for 3 to 4-ton trucks is that built by the Maudslay company. The worm is invariably mounted above the worm wheel.

In the Maudslay worm-drive axle the whole of the imposed load is carried on a solid forging, which is enlarged at the center to accommodate the housings in which the worm, worm wheel and differential gear are located, the top casing being arranged to take the whole of this gear, so that when the differential shafts are withdrawn from the end the whole of the interior parts may be withdrawn bodily for examination or repairs, while the bottom casing acts only as a cover.

One of the finest examples of worm-driven axles for passenger vehicles is that fitted to the Daimler motor bus chassis. The worm and worm wheel in this case is of the Lanchester type, and the containing casing is made of cast steel, with conical forged-steel tubular extensions, on which the wheels are journaled. This axle is provided with a double stay, and a feature that should be noted is the provision, just above the horizontal parting line of the axle casing, of a stamped sheet-metal tray, which is intended to catch all oil or fat that may ooze through the bearings and joints. All the latest type motor buses in London have axles of this type, and they are giving generally very satisfactory results.

Double-Reduction Gear Live Axles

As we already have remarked, the only British builder who is using the worm-drive for 5 and 6-ton machines is the Dennis company, all the other builders preferring to use a double-reduction-gear axle, with a combination of bevel and spur gearing; these take a great variety of forms. There is the Leyland axle, with its solid forging, dipped in the middle to carry the double-reduction and bevel gear, while the drive to the wheels is transmitted by the differential shafts which pass through the hollow extensions of the axle forging. Then, again, there is the Maudslay 5-ton axle, in which the same type of forging used on their worm-drive machines is retained, but, in place of the worm wheel, a spur gear ring is fitted, and meshing with this is a spur pinion, that is mounted on the same shaft as a bevel wheel; the bevel wheel is driven by a pinion which is universally connected to the cardan shaft.

A modification of this type of axle is used by the Wolseley company; in this case the Maudslay type of forging is also used, but it is canted over to an angle of about 45 degrees, the whole of the gearing being carried in the front casing, while the back casing merely acts as a cover. Another good example of double-reduction axle design is that shown on Walker's Pagefield lorry, which is, without a doubt, the strongest form of construction of any of the vehicles exhibited. In this case, also, a solid forging takes the imposed load, and both the torque and thrust are taken to a spherical socket through a central member, but the axle is so arranged that the first reduction is through bevel gearing on to a differential counter shaft behind the main body of the axle, and the drive thence is through two sets of spur gearing to the wheel driving shafts; the advantage of this construction is that the back casing, together with the crown wheel, differential and final-drive spur gears may be removed without disturbing the road wheels, jacking them up, or disturbing the load or load platform.

Access to the inside of the axle may be obtained with perfect ease from the back, and not, as in all other cases, by lifting the top portion of the casing off. For haulage contractors' service this is a decided disadvantage, and the Pagefield lorry will, undoubtedly, appeal to them on that point.

A still further variant of the double-reduction axle is that fitted on the Thornycroft War Office 4½-tonner, which is one of the machines that was successfully in the tests inaugurated by the war department for vehicles built to their specification, to earn the Government's grant for subsidization. Here, again, a solid forging sustains the imposed load, but the first drive is through spur gearing, while the final drive to the differential cage is through bevel gearing, the design in this case, also, being such as to enable the final-drive gear and casing to be dismantled without disturbing either the wheels or the load platform.

It has been argued that the unsprung weight of a live axle, either of the worm or double-reduction-gear type, is considerably greater than on chain-driven machines; although it certainly is somewhat heavier, the objection is not a serious one, and the alarmists' prediction of excessive tire wear has not been borne out in practice.

In addition to the forms of axle named there is the type in which a bevel-driven countershaft is either carried from perch bars, or on the axle body itself, and the final-drive to the back wheels is taken through spur pinions and internally-toothed gearing. Examples of this construction were the well-known Milnes-Daimler, the Berna and the Minerva chassis. In every instance the gears are now completely enclosed in dust-proof and oil-retaining cases, as also are all universal shafts and other important working parts.

With few exceptions British builders are now using cast-steel road wheels, and large users have found that, with the advent of these wheels, their bills for wheel maintenance have been reduced almost to vanishing point. A few makers are using wheels with tubular spokes, but by far the greater number are employing the cruciform section "Y" spokes. The diameters, over the solid rubber tires, range from 32 inches for a 1-tonner, up to 42 inches for a 5-tonner. Twin tires, each from 5½ inches to 6 inches wide, are considered the most serviceable section for driving wheels of 5-ton gasoline trucks.

Wheels and Tires

The employment of tubular steel wheels is rapidly increasing. The London General Omnibus Co. is replacing all the cruciform section with spokes of the tubular form. Weight for weight, it is found that the tubular spoke wheel is of greater strength, and by no means so liable to fracture. All the metal wheels employed, with very few exceptions, are of cast steel having a tensile strength of 30 tons per square inch, with an elastic limit of 16-18 tons.

A great proportion of these wheels are cast either in Belgium or Germany, and the number of manufacturers who are able to turn out this type of wheel is very limited. Forged steel and malleable iron wheels are practically unknown. In early days a few malleable iron wheels were tried but the results were very disastrous.

The cast steel wheels have been brought down to a very low weight. For instance, the cast steel wheels for 3-ton vehicles, or say a London omnibus are reduced to 600 pounds in weight for the set of four wheels. This, of course, is the weight without the tires and brake drums. Originally these wheels were made very much heavier, but owing to the better materal now employed light wheels are giving every satisfaction.

There is no doubt that the tubular spoke wheel is more difficult to cast than the cruciform section, and therefore is more costly. For this reason some manufacturers are inclined to still employ the cruciform section, but in such cases where weight has to be cut down to the lowest limit, and price is not the first consideration, tubular spokes are being extensively employed.

The size of the tires on a London omnibus, which is equivalent to a 3-ton vehicle, are for the front wheel 900 by 120 single, and for the back wheel 1,000 by 100 twin. When fitted on steel wheels the cost of running these tires is slightly under 1 penny per mile run, and at this figure contracts can be entered into with tire manufacturers who will supply and maintain the same. The penny per mile may be taken as a general figure as the tire cost of a 3-ton vehicle.

Springs

The plain semi-elliptic type of spring, the front ones being shackled at one end and anchored at the other, and the back ones being likewise mounted if either torque or thrust is to be transmitted through it, or shackled at both ends of torque and thrust members are provided, have become the absolute standard in this country. The use of three springs, one transversely arranged, for the back axle, long since has been discarded, although a few continental builders, the Berliet company, for instance, still retain it.

There has been considerable lengthening and flattening of the springs, and there is no doubt that these alterations have conduced to smoother and quieter running of the vehicles, and the reduction of maintenance costs. It is no unusual thing now to find rear bearing springs as long as 5 feet on British trucks, the widths going up to a maximum of 3½ inches, although one continental machine, the Minerva, had springs 4½ inches wide. The last named vehicle, however, is considered a

freak by makers and users in this country, and one can hardly conceive why it and the heavy Berliet chassis were sent to the English show, unless it was to give our constructors an opportunity of gauging how much they have progressed, as compared with continental practice, during the past 5 years.

On no English-built commercial-vehicle trucks, of over 2-ton capacity, are spring-mounted shackles fitted, although a few continental makers, including Buessing, now generally use something of this type, but their advantages, if any, have not yet been sufficiently demonstrated to convince builders on this side that they are either safe or necessary. It is, however, the invariable practice of our builders to fit lubricators to all shackle pins, and some of these are of particularly stout construction, necessarily so, because they have to withstand much rough usage in the docks and repair shops.

Frames

The pressed-steel form of frame construction is that most generally favored by English constructors, the depth of the frame varying, within practicable limits, with the bending moment at any particular point of a section. In a few trucks, however, such as the Halley colonial wagon, plain rolled-steel side members are fitted; while the sole example of special construction is that embodied in the Austin 2-ton chassis.

The vehicle has a lattice-girder type of frame, and an entirely novel form of transmission from a differential casing, through two diagonally-disposed cardan shafts, to separate bevel gears on the back wheels, the back axle passing through slots in the side members of the frame, and is sustained therefrom by double-elliptic springs, one above and one below the axle; both torque and thrust is taken through the forward halves of these springs.

The chief claim made for this wagon is that, while possessing an all-gear drive, it has the advantage of a very low loading platform, but the advantage is of more theoretical than practical use, as it is highly improbable that Mr. Austin will be able to persuade dock managers and large warehouse men to lower their load platforms to suit vehicles of his type. It is more practicable to build machines to fit existing loading facilities than to ask for the loading facilities to be altered to suit the vehicles.

Special Design

In addition to the standard exhibits among gasoline trucks there were a few machines built for special service, and the most striking of these was a 75-horsepower colonial truck, for 6 to 8-ton loads, built by Halleys. This truck has been designed for service over very rough roads in Patagonia, and naturally it has a very high clearance, a tilting front axle giving three-point suspension to the complete machine, a differential-locking gear, and winding drums built integral with each of the two back wheels.

A colonial model also was shown by Thornycrofts, which, while embodying all the standard engine and transmission features of the well-known Thornycroft chain-driven vehicles, has a tilting front axle, and extra large rubber-shod wheels, with special provision for securing steel shoes over the rubber treads, so as to enable the vehicle to travel over loose sand. A number of these machines were supplied to the Japanese government some few years ago, and others are working in southern Nigeria and various other parts of the world with very great success.

The front-wheel-drive Mass tractors also were shown, and, if one may judge by the number of "sold" cars which were attached, they appear to be finding a considerable amount of favor among English furniture removers and haulage contractors. There is no doubt that such a machine has a very useful field.

Steam Wagons

Very few steam wagons were shown, the builders of this class of truck preferring to exhibit their machines at the Royal agricultural show, and other shows up and down the country, in preference to sending them to Olympia. Clayton & Shuttleworth, Foden, Garrett, Taskers, Wallis & Steevens, and the Yorkshire Steam Wagon Co. were, however, represented, Taskers and Wallis & Steevens being the only two that showed tractors in addition to steam wagons.

There is little to record in the matter of steam wagon development, except that the British local government board recently has sanctioned the use of the engine as a brake, but has issued an order that, in future, the other brake which is required to meet the regulations must be of such a type that there is an independent drum and shoes for each of the driving wheels. On some of the exhibits of the steam-wagon builders the new regulations have already been observed, although there will necessarily be a considerable period of grace before the regulations are stringently enforced by the local government board.

Motor Fire Engines

The gasoline motor fire-engine has taken a firm hold of British local authorities, and even the smallest of urban district councils are falling over each other in their anxiety to possess one of the latest, and certainly most efficient, type of fire-fighting plant, and, as might be expected, quite a number of fine examples were staged at Olympia.

The centrifugal turbine type of pump practically has become the accepted standard, and the trade is generally drifting into the hands of a few makers who have specialized in the design of such equipment. Commercar-Simonis, Dennis Bros., J. & E. Hall and Leyland Motors, Limited, were the only four people exhibiting, but by far the largest motor fire-engine ever seen in this country was the 120-horsepower Commercar-Simonis engine, which has been built for Vancouver; its engine has six separate cylinders, 140 millimeters in diameter, with a piston-stroke of 190 millimeters, and the capacity of the turbine pump is 850 gallons per minute.

The chassis of this large engine is of entirely special construction and is so arranged that the drive from the engine passes direct to the turbine pump, which is mounted at the back of the chassis, while the drive to the road wheels is from a layshaft below the mainshaft in the gearbox, so that the maximum of efficiency may be obtained when driving the pump, there being always more than enough power to propel the machine at high speed along any road. The final drive to the road wheels is through inclosed roller chains.

The most usual capacity of pump for large fire brigades in England is from 450 to 600 gallons per minute, most of the machines now in service of the London fire brigade being of those sizes. Some of the fire engines shown were of quite small capacity, from 300 gallons per minute and upwards, and of a type that is now being largely adopted by the owners of large country estates, the destruction by fire of many fine old country mansions having at last awakened their owners.

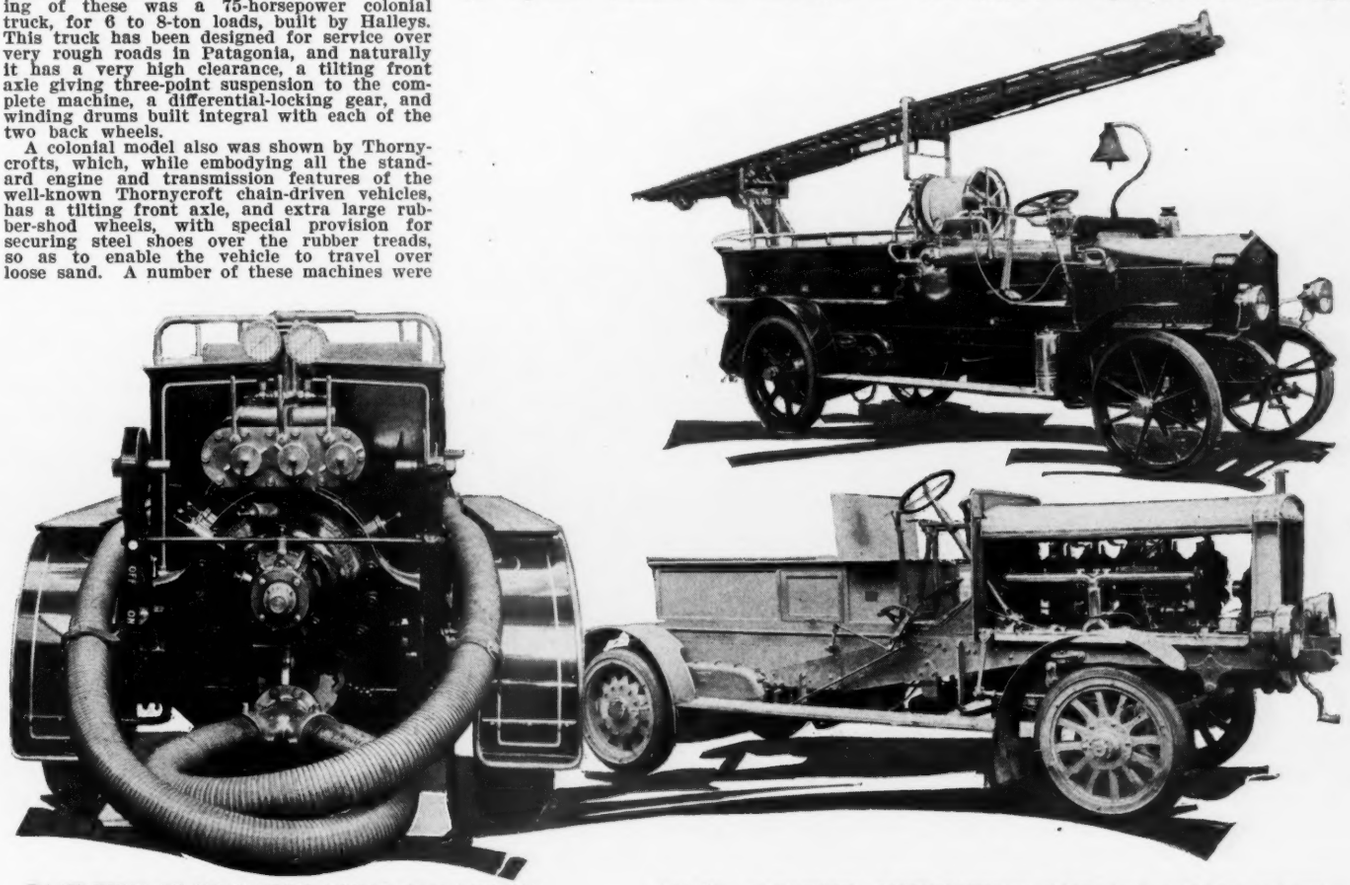
Ratio of Engine Power to Load

While there is still considerable divergence of opinion regarding power to load, it is interesting to compare the figures given in the following table, for 3, 4 and 5-ton machines, as the data given therein may be taken as representative of British contractors' practice concerning 3, 4 and 5-ton vehicles. Below the capacity of 3 tons it is practically impossible to select any figures which could reasonably be taken as typical examples, as, on these smaller machines, the divergence of opinion becomes greater:

TYPICAL DATA OF BRITISH TRUCKS, FOR LOADS OF 3, 4 AND 5 TONS

	3-ton	*4-ton*	*5-ton*
Diam. of cylinders...	4.5 "	4.5 "	4.75 "
Piston stroke	5.0 "	5.0 "	5.5 "
Diam. of valves.....	1.875"	1.875"	2.125"
No. of piston rings...	4	3	3
Total ratios of gears:			
1	21.6	37.3	38
2	14.2	20.2	20
3	9.4	12.1	12
4	6.2	8.0	8
Diam. of front tires..	31.10	35.43	36.02
Diam. of back tires..	33.85	41.33	41.33
Wheelbase	13'0"	13'6"	14'0"

In conclusion, the authors beg to acknowledge their indebtedness to the editor of the Commercial Motor, who has been kind enough to supply us with a number of photographs and sketches for reproduction in Motor Age.

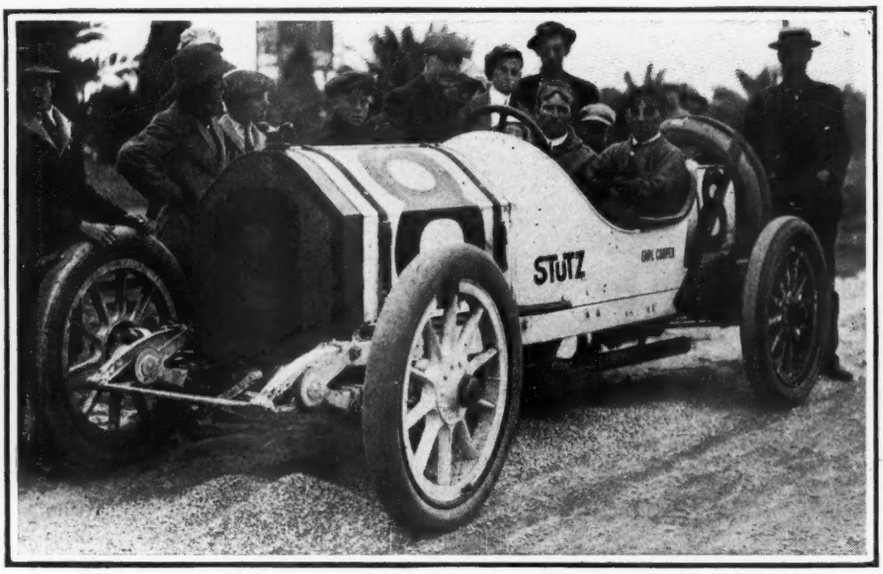


BACK VIEW OF 600-GALLON MOTOR FIRE ENGINE USED IN ENGLAND

ABOVE, HALLFORD COMBINATTION HOSE AND LADDER TRUCK. BELOW, COMMER-SIMONES FIRE ENGINE

Santa Monica Honors Go to Earl Cooper

Stutz Driver Defeats Classy Field in California Classic



EARL COOPER IN STUTZ THAT WON SANTA MONICA ROAD RACE

Winner Averages 73.77 m. p.h.—Oldfield, Mercer Second

LOS ANGELES, CAL., Aug. 9—Special telegram—Earl Cooper of San Francisco, driving one of the three Stutz cars which competed in the 500-mile international sweepstakes at Indianapolis Memorial day, duplicated his victories scored last month in the Tacoma speed carnival this afternoon when he won the annual Santa Monica road race and earned the title of Pacific coast speed king.

Covering the fifty-three laps, or 445.2 miles, in 6 hours, 1 minute and 52 seconds, Cooper averaged 73.77 miles an hour in his victorious drive and humbled Teddy Tetzlaff, twice winner of the coast classic, and Barney Oldfield, the veteran pilot, who trailed in second place 5 minutes and 53 seconds behind the winner. Although forcing Tetzlaff to bow before him, Cooper failed to equal the world's record of 78.61 miles an hour established by Tetzlaff in winning the Santa Monica race of last year.

Driving as fearlessly as he did when in his heyday, Oldfield, at the wheel of a Mercer, gave Cooper a battle every inch of the way and thrilled the vast throng by his spectacular bursts of speed. Louis Nikrent, in a smaller Mercer, was third after driving a consistent race throughout.

Only Three Fnish

After Nikrent got the checkered flag, the crowds surged out upon the course, forcing the referee to wave in the other contestants, four of whom were given prize money. Verbeck, who took the Los Angeles-Sacramento race July 4 and who was an added starter in the Fiat today, was running in fifth place when the race was called but moved up automatically into fourth position when Frank Goode, driving the Apperson, was disqualified for taking on gasoline outside of his repair pit. Trailing Verbeck came McConners in a Speedwell, Beaudette in a Cadillac, Siefert in a National and Soules in a Cadillac.

SANTA MONICA RESULTS

No.	Car and driver	Time	M.P.H.
8	Stutz, Cooper	6:01.52	73.77
3	Mercer, Oldfield	6:07.45	72.63
5	Mercer, L. Nikrent	6:28.17.2	68.91

Running When Race Was Called

15, Fiat, Verbeck, 44 laps, 6:24.50; 6, Speedwell, McConners, 43 laps, 6:23.14; 12, Cadillac, Beaudette, 36 laps, 6:24.44; 14, National, Siefert, 32 laps, 6:28.31; 10, Cadillac, Soules (time not taken).

No. 11, Apperson, Good was running in fourth place when the race was called but was disqualified for taking on gas outside of his pit.

No. 7, Stutz, Lewis, out on first lap.

No. 2, Apperson, Hanshue, out on eleventh lap when car caught fire.

No. 9, Buick, Opsahl, out with cracked cylinder.

No. 1, Mercer, Morris, out with broken connecting rod.

No. 4, Fiat, Tetzlaff, out on twenty-sixth lap with broken gas line.

Fourteen Cars Start

Although fourteen cars were sent away with engines roaring a determined challenge, the notes of but two—Cooper's Stutz and Oldfield's Mercer—had a defiant sound at the end. The race was a battle royal between the Stutz driver and Barney from starting bomb to checkered flag. The victory of Cooper was more close than the difference in time indicates. With only two circuits to go, Cooper had but little better than a lap lead on Oldfield and a bad tire forced the Stutz to stop and trouble was experienced.

Oldfield passed the stand on his next to the last lap while the Stutz was still silent at the pits and had covered 3 of the 8 miles of the fifty-second circuit before Cooper started away on his final dash. Realizing that he had but a slight advantage, Cooper drove as he did when he relieved Gil Anderson at Indianapolis. The sturdy Stutz responded. Thundering over the roads and increasing his slender lead at every revolution of the wheels, the Stutz driver shook off Oldfield's desperate challenge and flashed over the line a victor with 5 and a fraction minutes to spare.

Five of the fourteen starters encountered mechanical trouble that changed them from ambitious contestants to disgruntled spectators. Dave Lewis' Stutz was the first to be eliminated, Cooper's teammate driving less than a lap before he docked his disabled car. Opsahl's Buick was retired with a cracked cylinder. Hanshue, a native son, idol of a bygone day, was forced out when a connecting rod on his Apperson broke and the car caught on fire on the far side of the course, the flames soon reducing the big machine to wreckage. Gaston Morris experienced the same mechanical difficulty as did Hanshue, the connecting rod on the No. 1 Mercer giving way early in the race.

Tetzlaff Retires

The showing of Teddy Tetzlaff, twice winner of the Santa Monica classic and holder of the world's road racing record, was a disappointment to the throng which had picked him as favorite. His Fiat broke a gasoline pipe and so much time was lost in repairing the damage that Teddy retired on the twenty-third lap when running in eighth position.

Early in the contest Siefert's National caught on fire and although the car was not seriously damaged, the driver and his mechanician were burned. After receiving medical attention, Siefert returned to the course, directed the repairing of his mount and resumed the race.

F. L. Terry, mechanician for Beaudette, driver of the No. 12 Cadillac, fainted twice during the race, the first time at Death Curve. The car was stopped and Terry, as soon as revived, insisted on continuing. Scarcely a mile further on, he fainted for a second time but again refused to be relieved, sticking to his seat and riding into sixth place with Beaudette.

At the very outset, Cooper started to have trouble. He stopped at his pit before covering a circuit and Oldfield, by circling the 8.5 course in 7:14 went to the front. Cooper cut this lead down and was first on the third lap, but on the sixteenth lap tire trouble enabled Oldfield to draw up on even terms, he and Cooper being tied at this stage.

In the next lap Oldfield led by 1 second, but that was his last time in front, as Cooper never was headed from then on. On the twentieth lap Cooper led by over 4 minutes. With half the race finished, Oldfield had crept up again and was only 2½ minutes behind. For lap after lap Cooper and Oldfield fought it out with the Apperson and Nikrent's Mercer always within striking distance.

At the end of the fortieth lap Cooper led by 2 minutes 10 seconds, and with fifty laps finished and only three to go, Cooper's lead was 3 minutes 25 seconds.

The weather was ideal and the fast time made substantiates the claim of Californians that Santa Monica is the fastest road racing course in the country. It is estimated that 75,000 spectators witnessed the race.

GRANT ENTERED AT ELGIN

Chicago, Aug. 11—Harry Grant, driving William Ziegler's Isotta, will be among the many stars who will drive at Elgin August 29-30, his telegraphic entry being received today. Grant will be in the second day's race.

N. H. Van Sicklen, who is securing entries for the Savannah meet, announces that he has just received the Mercer nominations. De Palma, and Wishart will be in three events—the grand prix, Vanderbilt and Savannah Challenge races.

WISCONSIN TOUR ABANDONED

Milwaukee, Wis., Aug. 11—The fourth annual Wisconsin State Automobile Association reliability tour, scheduled for August 25 to 29, was indefinitely postponed on Saturday because of the refusal of the A. A. A. to grant a sanction for the event. The situation is a unique one and is liable to stir up a hornet's nest among Wisconsin motorists.

The W. S. A. A. planned this year's tour as a grade 1 tour for stock cars, with preliminary and final technical examinations, motor, clutch and brake tests, etc. Chairman Schmipf of the A. A. A. contest board found himself in a peculiar situation, however, when application for the sanction was filed. No manufacturers have filed stock car specifications with the A. A. A. contest board this year.

As Wisconsin dealers insisted that the run be a grade 1 event or nothing, and refused to be content with a grade 3 run, the W. S. A. A. requested the A. A. A. to grant the grade 1 sanction and permit the Badger body to pass upon the eligibility of entries in regard to compliance with the stock car rule. This the A. A. A. refused to do, and offered to sanction the run as a grade 3 event, but knowing the minds of its prospective entrants, the W. S. A. A. was obliged to refuse a grade 3 sanction. The only alternative was to cancel the tour, which was done by indefinite postponement. This lack of a stock car class also compelled the postponement of the Chicago-Boston day and night reliability.

BOULEVARD NO LONGER GARAGE

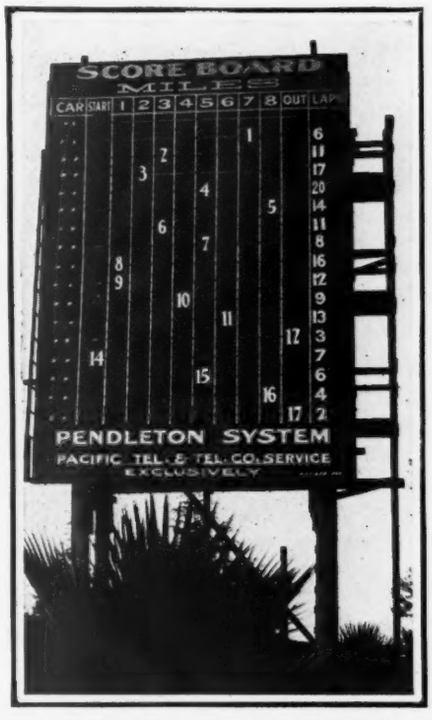
Chicago, Aug. 9—The south park commissioners have revoked the permit which turned Michigan avenue into a garage and have returned to the old order which allows cars to stand by the curb only 1 hour. This means that no longer will owners be permitted to park their cars in the center of the boulevard. Objection was made because this parking destroyed the beauty of the boulevard, many owners leaving their cars on the street all day. The commissioners also declined to permit the Chicago Automobile Club to finance a proposition which proposed to construct a big garage under Grant park for the purpose of taking the cars off the street and thus relieving congestion.

MAINE PICKS PAUL SARGENT

Augusta, Me., Aug. 9—Paul D. Sargent, of Machias, Me., former highway commissioner of the state and for the past 3 years connected with the United States department of public roads at Washington, has been chosen as chief engineer of the new state highway commission which the last legislature brought into being to begin the construction of roads under some real systematic plan. He gets $5,000 a year, the highest salary paid to any state official.

Next Grand Prix Will Limit Tires

PARIS, July 30—After limiting the supply of gasoline, it is proposed to limit the number of tires to be used in the next French grand prix. If the proposed rules meet with the approval of manufacturers and the club committee, the cars to line up in the 1914 French grand prix will have a limited supply of gasoline in a sealed tank and seven tires, including the four on the road wheels, with which to cover a distance of 500 to 550 miles. If the motor uses more gasoline than is allowed, or if more than three tires are blown out, that particular racer will have to drop by the roadside. The gasoline allowance has not yet been decided on. It certainly will not be more than 14.1 miles to the gallon, as allowed this year. It is quite possible that it will be less, for this year's racers all finished with a big supply of gasoline in hand. When once the race is started, the competitors will have to fight it out altogether unaided. There will be no tire pits, no gasoline pits, probably no water supply, and no spare parts.



SCORE BOARD AT SANTA MONICA

It is believed that these rules will tend towards all-round efficiency and will bring into prominence the necessity for closer attention to sound tire construction and a design of car which will economize tires. This year's race already has proved the wonderful efficiencies obtained under limited fuel rules, the cars built under these rules more closely approaching standard product than any set yet seen on a racecourse. It is felt by European makers that it is time to seriously tackle the tire problem, not only so far as it concerns the tire itself, but also as regards the car as a "tire-eater." Both phases of the problem have been neglected.

Although tires this year gave good results, it is certain that they can do better if put to a public test such as this race would afford. Car manufacturers would also have to pay close attention to the problems of weight, correct balance, clutches and final drive. Already some of the leading French firms have carried out careful experiments with a view to ascertaining the life of tires with various forms of clutches, bevel and worm drive, spring couplings, etc. The result has been really surprising.

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Know Your Car

IF YOU drive your own car and wish to get that real pleasure that comes from mastery, then you must know your car. You must learn it, you must conquer it. Until you do this you will be a slave to it. Your pleasant moments will be filled with silent terror; terror lest something goes wrong and you will not be able to even diagnose it, much less repair it. You will, in a word, be a slave to your own ignorance. You will be crossing bridges that never exist.

THIS CAR mastery role is becoming more and more important in proportion as new devices, which may call for attention, are added to the car. Since self-starters have been added it is more than ever necessary to have at least some elementary knowledge of electricity. Before the self-starter movement took its conquering hold, the car driver required little knowledge of electricity, because magneto makers had perfected their ignition specialties so that they could go from season to season with little attention more than occasionally adding a few drops of oil here or there. The self-starter which was precipitated on the market naturally made its debut with a few shortcomings, and these demanded a better stock of car knowledge.

BUT MASTERING your car is not only confined to matters electrical. There are many more commonplace things that call for this first-hand knowledge. Inserting an inner blow-out patch in a casing is a simple example. If you rely on the cheap repairmen you encounter in the garage you may ruin a casing and also an inner tube. He will insert an under-sized patch; nine times out of ten he will not insert it correctly and trouble will ensue. The trouble that follows will be another nightmare, all due to ignorance, failure to master the car.

IT IS NOT expected that every car owner will master his car. The owner with his chauffeur rarely bothers with mechanical matters until a time when maintenance charges become alarmingly high and he institutes investigations and gets interested. On the other hand the man who makes a pretense at driving his own car and caring for it, outside of the simple garaging and washing, is making a serious error if he aims at going as long as possible without getting down to business and studying matters first hand. He is like the ostrich that buries its head in the sand to avoid being seen by the hunter. He is traveling to certain trouble. The very ignorance he is developing is the surest path to trouble. Instead of the delicate ear that discerns trouble, he is cultivating the ear that hears not. Instead of the sensitive touch he is benumbing his sense of touch. In a word, he is about as good an enemy to his car as possible.

PERHAPS the greatest error to which such a driver falls a victim is that of the incompetent repairman. Being ignorant himself of all car technicalities, he is the more inclined to put implicit trust in any repairman. He looks upon them all as superior mortals, endowed with a mystical something that other less fortunate humanities cannot become possessed of. In proportion as he bestows such faith is he certain to pay for it. Often the repairman knows about as little about the machine as the owner, perhaps a great deal less. If the owner possessed even a smattering of the element of the car he would be in a position to judge if the job were being gone at in the proper way. He would be able to detect the ignorant, incompetent workman from the expert. He would know, at least, if a job were completed. With the sane-car and the sane-driver movement progressing as it is today, it is more and more important that the private owner who wants to live and enjoy his car begin the mastery of it. This does not mean foolish tinkering with parts, but the obtaining of a correct knowledge of all details, so that he becomes competent to know, whether the correct blowout patch is being used, or if the steering gear has too much backlash or not.

Truck Progress Abroad

ON OTHER pages of this issue are given the leading trends the motor truck industry, so far as England and some other continental countries are concerned. This show, the first one held in England in the last 5 years, has been a good object lesson in the progress that has been made in motor truck construction. In following the avenues of progress the most conspicuous feature is the fact that progress is gradually following the same lines as it did in the passenger-car days. The inclosed rear axle drive is one of the best examples of this. Five years ago the few exponents of worm or bevel drive were looked upon as experimenters. Today the tide has turned. In the heaviest vehicles the inclosed drive is making headway, and at the present rate of progression it will not be many years before chain-driven vehicles will be as rare as they now are in the passenger-car field.

IT is not yet a settled fact as to what type of rear axle eventually will dominate, if such a condition ever comes. When the inclosed axle was discussed a few years ago the worm-driven style was looked upon as a certainty, but the recent favor of the war department of England to the double-reduction bevel-spur type of axle has changed the face of affairs, so that today many concerns are using this double-reduction design in preference to worm-driven types. By this it must not be construed that worm drive has shown any shortcomings, but rather that the war officials have seen fit to arbitrarily set their approval upon one type in preference to another. Today it is rumored in inside circles that the department is going to reconsider its ways and that it has practically decided to recommend worm drive in the same way that it has recommended the bevel-spur inclosed type of axle.

THE laws of mechanics may some day place a limit on the use of either type. There is a limit to the amount of reduction possible between the worm and worm wheel, and, should ratios of 20 to 1 become imperative in certain fields, it is possible that the double-reduction type will prove the better for such a design.

IN power plants for trucks there is a pronounced trend to smaller motors and longer strokes. More attention is being given to increased radiator and waterjacket capacity, and the water pump is in general use, thermosyphon circulation having a very limited following. The protecting of all important motor parts from water is a commendable feature. This is being extended to ignition and carburetion equipment. Throughout the chassis in general there is an aim for accessibility.

Dates for Two National Shows of 1914 Announced

New York, January 3-10; Chicago, January 24-31

NEW YORK, Aug. 12—The dates for the two national shows to be held next winter in New York and Chicago have been decided upon. The New York exhibition will be held in its entirety in the Grand Central Palace during the week of January 3-10. The Chicago exhibition will be held at the Coliseum and First Regiment Armory as formerly, the date being January 24-31. Both of these exhibitions will be conducted under the auspices of the Automobile Chamber of Commerce. This will be the first time one association has been in actual control of both exhibitions since the Selden patent legislation matters divided the membership of the N. A. A. M. into two camps which brought about several shows.

Four floors of the palace will be pressed into service for the exhibits and the additional space over that which was had last year is 50,000 square feet. Cars will occupy the first and second floors of the palace and all of the wall spaces of the other floors. The space about the wall on the second floor and other sections on the same floor which may be needed for the purpose will be devoted to a special section for the exhibition of electric cars. On the third floor in the spaces not occupied by car exhibits will be shown the products of the Motor and Accessory Manufacturers and in addition to this space 15,000 feet of the fourth floor will also be utilized for the products of the accessory association. The Motor and Accessory Manufacturers will make the allotment of spaces to its members, as has been the custom in the past. It is expected, also, that the Motorcycle Manufacturers' Association will show its products on the fourth floor. Space can be had also on this floor for accessory makers and jobbers who are not members of any organization. In other words, there will be room for every manufacturer of motor cars, parts, and accessories who desires to show his product during the period of the national exhibition.

For the Chicago show the gallery of the Coliseum will be extended at the sides and each end of the building will be lengthened by 24 feet, this arrangement adding 5,000 more feet of space for the exhibits. The aisles will extend around the inside of the balcony instead of the outside as heretofore, so that the exhibition space will be given greater depth. There will be also a slight rearrangement of the main floor. Three-fourths of the center of the main floor of the armory will be devoted to the exhibition of electrics. So successful was the plan last year that the Electric Vehicle Association has asked for and has been granted larger space.

S. A. Miles, general manager of the Automobile Chamber of Commerce, 7 East Forty-second street, New York, is busily engaged on the plans for both exhibitions and he expects that application blanks and diagrams will be issued by September 1. There will be but a few changes in the rules governing the exhibitions. Exhibits of cars will be confined to passenger vehicles inasmuch as no commercial show will be held in conjunction with the passenger vehicle shows. At the request of the makers the commercial vehicle exhibition was abandoned. Another change which affects the admission is that there will be but one double admission day at each show instead of two, as was formerly the case in New York.

WALPOLE AFFAIRS IN COURT

Boston, Mass., Aug. 9—The financial affairs of the Walpole Tire and Rubber Co. came up again today before Judge Dodge in the United States district court when a hearing was granted on the petition of the trustees in bankruptcy of George A. Alden & Co. of Boston, crude rubber dealers, who sought to have one or more additional receivers appointed to act with Robert C. Fisher of New York. A large number of New York and Boston attorneys attended the hearing, but it could not be learned whether a majority of the creditors were in favor of continuing Mr. Fisher as the sole receiver or wanted others. Judge Dodge considered that the creditors of the Walpole company were well represented, there being something like $700,000 worth of claims having counsel. It finally was decided by counsel in the case to have a meeting in New York city next Wednesday of the creditors to vote as to what the court should order in the case. Then Judge Dodge will give another hearing on next Saturday when he will determine what should be done on the petition as asked for by the George A. Alden Co. for additional receivers.

CONTESTS.

August 18-20—Fourth annual Wisconsin reliability tour.
*August 29-30—Elgin road races, Chicago Automobile Club.
August 30—September 6—Reliability run, Chicago Motor Club.
September 9—Corona beach race, Cal.
September 8-15—Around Lake Michigan tour; Chicago Motor Club.
September 12—Track meet, Canfield, O.
September 13—Track race, Grand Rapids, Mich.
*September 13—Track meet, Covington, Ky.
September 20-21—Track meet, Detroit, Mich.
September 21—French light-car road race, Boulogne.
September 25—Tourist trophy stock-car road race, Isle of Man, Great Britain.
October 4-11—Chicago Motor Club's Around Lake Michigan reliability.
November 6—Track meet, Phoenix, Ariz.
*November 24—Vanderbilt road race at Savannah, Ga.
†November 27—Savannah grand prix.
*Sanctioned by A. A. A.
†Sanctioned by A. C. A.

Shows

October 15-25—Electric show, Grand Central palace, New York city.
October 17-27—Paris show.
October 27-28—Convention Electric Vehicle Association of America, Chicago.
November 7-15—Olympia show.
January 3-10—New York show, Grand Central palace.
January 24-31—Chicago show.
January 31-February 7—Minneapolis show.

RECEIVER FOR MICHIGAN BUGGY CO.

Grand Rapids, Mich., Aug. 9—According to the petition in bankruptcy filed against the Michigan Buggy Co., of Kalamazoo by the Salzburger & Sons Co., of Chicago, and the First National Bank of Cleveland, O., which resulted in the appointment of the Detroit Trust Co. as receiver by Judge Sessions, the liabilities of the company are placed at $1,600,000, a large portion of this alleged indebtedness being in the form of commercial paper or unsecured promissory notes. It is declared that a number of Chicago and Detroit banks, as well as banks in the east, are holders of the paper. The assets are said to be about $2,000,000. The Salzburger & Sons Co. claims an indebtedness of $8,483.44, while the bank claims $2,393.70. The petition alleges that the gross business of the company in 1912 was $6,000,000. It is said if the business is carefully handled and continued until a sale as a growing concern can be made the creditors will lose nothing. The bond of the receiver has been fixed at $50,000. The company manufactures the Mighty Michigan and other varieties of vehicles.

CASE 1914 LINE ANNOUNCED

Racine, Wis., Aug. 12—Three models, a 25-horsepower car listing at $1,250, an addition to the line; a 35-horsepower car at $1,850 and the 40 at $2,300, are announced for 1914 by the J. I. Case T. M. Co. One of the features of the new line is the complete equipment that is offered, the Case company having decided to not only fit the usual extra demountable rim but to put an extra tire on it, a tire cover and two extra inner tubes. The new cars will carry Weed chains and electric vibrator horn as regular equipment in addition to the Westinghouse electric starting and lighting system, Warner speedometer, 8-day clock, mohair top, etc. Oversize tires are fitted to all models.

The new 25-horsepower car has a wheelbase of 110 inches and left drive and center control. A T-head motor 3¾ by 4¾ is used. The 35 has a 4¼ by 5½-inch motor and the 40 one with 4½ by 5¼ bore and stroke.

Mercer Wins All Five Races at Brighton Beach Meet

De Palma Captures Four and Wishart One

DE PALMA WINNING BRIGHTON BEACH FREE-FOR-ALL

NEW YORK, Aug. 9—The first track meet of the season conducted by the Motor Dealers' Contest Association was held this afternoon on Brighton Beach track and an attendance of over 12,000 together with more than 1,000 cars parked around the track demonstrated that public interest in track racing still continues. The program of five events lacked interest in that there was not enough competition, all five events being won by Mercer entries, Ralph de Palma in the racer he drove at Indianapolis, winning in a walk-away fashion the four events he was entered in and Spencer Wishart taking the fifth race. It was a Mercer field day from start to finish.

Two accidents occurred during the 25-mile free-for-all. Jessop's National upset on the fourth turn and rolled over in the infield, due to throwing a tire. Both Jessop and his mechanism were badly shaken up. In the last lap Hickman's Stutz, which had pursued the two Mercers hotly throughout the entire race, threw a tire on the second turn and ran into the sand bank on the outside of the course. Hickman was not injured. There was a third thriller during this race when LeCain, driving another Stutz, threw a tire on the third turn and turned completely around twice on the track without upsetting. After making the two circuits he drove his car into the paddock.

A disappointment of the afternoon was the performance of the Peugeot racer recently piloted at Indianapolis by the late Zuccarelli. Ferguson was unable to keep the car running at any speed.

Owing to the lack of competition the times made were not what they might have been and it was only in the handicap that de Palma was forced to open up his big racer, when he showed circuits in 51 and 52 seconds.

Spencer Wishart won the first event, 10 miles, 231 to 300 cubic inches, in 10:17⅘, with Ferguson in another Mercer second, Montague Roberts in the Roberts Special third and another Mercer fourth.

The second event, 10 miles, 301 to 450 cubic inches, saw Mercers finish first, de Palma winning in 10:10. The Stutz was second and National third. The three cars were well bunched, the Stutz running but a few yards back of the Mercer throughout the race.

De Palma in the 5-mile, under 600, race covered the distance in 5:08. Wishart was second and another Mercer third.

The 25-mile free-for-all proved the best and yet most disastrous race of the day in that all of the accidents occurred in it. From the start it was evident that de Palma only opened his Mercer wide enough to hold the lead. His time for 5 miles was 4:35⅕, for 10 miles, 9:50⅖, for 15 miles, 14:15⅕, for 20 miles 19:39⅘ and for the 25 miles, 24:46⅘.

Hickman in the Stutz drove a spectacular race from the start until eliminated. Once or twice he drew alongside of de Palma only to be left behind in the back stretch. Wishart's Mercer finished second and Ralph Mulford in a Mason third.

The last event of the afternoon, a 10-mile handicap, was won by de Palma, who started from scratch. He caught Wishart, who was leading the field, at the end of the ninth lap so that he was able to run in a winner. Summaries:

Ten miles, 231-300 class—Wishart, Mercer, won; Ferguson, Mercer, second; Roberts, Roberts Special, third. Time, 10:17⅘.

Ten miles, 301-450 class—DePalma, Mercer, won; Hickman, Stutz, second. Time, 10:10.

Twenty-five miles, free-for-all—DePalma, Mercer, won; Wishart, Mercer, second; Le Cain, Stutz, third. Time, 24:23⅘.

Five miles, under 600 cubic inches—De Palma, Mercer, won; Wishart, Mercer, second; Ferguson, Mercer, third; Roberts, Special, fourth. Time, 5:08.

Twenty-five miles, free-for-all—De Palma, Mercer, won; Wishart, Mercer, second; Mulford, Mason, third. Time, 24:46⅘.

Twenty-five mile handicap—De Palma, Mercer, won; Wishart, Mercer, second; Mulford, Mason, third. Time, 9:35⅗.

RESULTS AT LIBERTYVILLE

Chicago, Aug. 11—Rain prevented the running of the second day of Alex Sloan's dirt track meet at Libertyville yesterday afternoon, but the card that was pulled off Saturday afternoon was interesting, despite the fact that the fields were small and the competition confined to the Cases. two Masons and a Mercer. The Mason driven by Rickenbacher proved the surprise party by beating Disbrow in the Simplex Zip in the first heat of the 5-mile heat race, traveling the second mile in :54. Disbrow turned the tables in the second heat but the race was not decided because of yesterday's postponement. Eddie Hearne won a 5-mile local race, driving a Case; Rickenbacher took Bill Endicott into camp in another 5-mile, while the 5-mile handicap went to Wilbur in a Mercer, Chandler in a Mason also was a winner. Disbrow in the Simplex Zip won the mile time trial in :52.90, and turned a mile in :54.92 in the Jay-Eye-See. The meet will be completed next Sunday.

ENGLAND BILLS 1914 RACE

London, July 31—The Royal Automobile Club has today announced conditions governing the 1914 international trophy race which will be held in June on the Isle of Man course. The race will be a 2-day affair of approximately 600 miles and will be open to four-cylinder internal combustion motors of 3,310 c. c. piston displacement and a minimum weight of 2,800 pounds, including driver, mechanic and all other necessaries. The rules call for standard or stock cars, with a minimum wheelbase of 9 feet, minimum tread 54 inches, minimum body width 40 inches and the gasoline tank of 50 gallons capacity, sufficient for both days' racing. The race permits of using any kind of fuel, a sample of same in an 8-ounce bottle to be furnished the club 14 days previous to the race. The rules require the carrying of two spare wheels or detachable rims and the provision of one supply depot on the course.

TO HANDLE MARATHON OUTPUT

Indianapolis, Ind., Aug. 12—Articles of incorporation will be filed here this week for the Herff-Brooks Corp., which will have an authorized capitalization of $100,000 and which will act as general distributor

of the Marathon line, manufactured by the Marathon Motor Works, of Nashville, Tenn. The officers of the new company will be: President, Jacob Herff, of the State Auto Co., Indianapolis; vice-president, Herbert Herff, assistant sales manager of the State Auto Co.; treasurer, George Herff, sales manager of the State Auto Co., and secretary and sales manager, H. H. Brooks, who has been sales manager of the Marathon company.

HUDSON CUTS BIG MELON

Detroit, Mich., Aug. 11—At the annual meeting of the board of directors of the Hudson Motor Car Co., held on August 7, a dividend was declared to the amount of $1,000,000. Besides this dividend, which takes the form of a 100 per cent stock dividend, there has been put aside $250,000 for the surplus account. With the total business of $10,500,000 an increase of 50 per cent was shown over the fiscal year ending July 1, 1912. The report also contained the interesting statement that the company has no bonded indebtedness.

The 1914 production of the six-cylinder model is now in full swing. The cars are being shipped at the rate of thirty per day.

Detroit Engineers Talk Gearshifts

DETROIT, MICH., Aug. 9—That the motor car engineer is thoroughly awake to anything new which may improve his car, no matter how skeptical he may appear to the salesman of a new device, was shown by the unusually large attendance of what might be called the older heads at the meeting of the Detroit section of the Society of Automobile Engineers, on Thursday.

The occasion of this turning out of the big engineers despite the hot weather, was the first of a series of talks that will be given before the section on the subject of gear-shifting devices. At this meeting Mr. Burford, of the Gray Pneumatic Gear Shift Co., explained the working of the Gray mechanism. This is a shifter which, as the name implies, uses the energy stored in compressed air for performing the gear-shifting functions. The air is stored in seamless steel tanks, it is stated, by means of a good air pump. When the air tank is placed at the back of the chassis an 11 by 33-inch tank is used and where the tank is more conveniently placed under the body the dimensions are 7 by 48 inches. The tanks are tested to 600 pounds per square inch, which gives an enormous factor of safety, for it has been found that the shifter works with good results at 50 to 100 pounds air pressure. Mr. Burford stated that he had gotten satisfactory operation with an air pressure as low as 25 pounds and as high as 300 pounds per square inch.

In order that a shifter may be foolproof it must be impossible to engage a different set of gears while the clutch is engaged. For this reason the air control valve is connected to the clutch. Thus, not only shifting of gears under load is prevented, but the shifting function is performed with the act of taking off the load, that is, the gears shift when the clutch pedal is depressed by the foot.

A feature of the device is that the first function carried out upon the admission of the air is to always bring the gears to neutral before bringing those gears which are next desired, into mesh.

Just what pair of gears will be meshed directly following the jump to neutral is governed by the position of the short lever on the quadrant placed just below the steering wheel. It is obvious that if this lever is at the neutral point no gears will be remeshed. In order to protect the driver from making a serious mistake the reverse position of the locating lever can be reached only by pressing the button in the end of the handle. This act is not necessary for the forward speed positions.

A great advantage over the usual method of hand-shifting which has been noted by the makers of this pneumatic shifter is the entire absence of the clashing of the gears upon any occasion when a car is in proper running condition. Mr. Burford said he never had been able to explain this phenomenon unless it was due to the speed with which the gears were shifted.

After a general explanation and demonstration of the mechanism which was set up in working order before the audience, the talk took the form of answers to questions by the members. It was brought out in the discussion that the shifter had worked equally well in summer and in winter during 29,000 miles of driving by Mr. Gray. Part of the tests were carried out in Wisconsin, at a time when the thermometer dropped to 37 degrees Fahrenheit below zero.

Up to the present time the largest part of the output has been used for attaching to cars already in the hands of owners. For this reason the shifter has been made so that it can be placed either in front or behind the gearbox. Although the mechanism itself now weighs but 28 pounds, this weight can be reduced where it is built into the original product, and the features for universal application to old cars can be left out. On the present model the piston diameter is 2 inches and the total stroke is $1\frac{1}{16}$ inches. The object of furnishing tanks of the large sizes quoted above is to allow for the operation of a Thurber starter, which very often is combined with the shifter. The total equipment in this case including the tank, empty, then weighs 128 pounds, it was stated.

Mr. Burford also brought out the points that a composition including some rubber in its make-up had been found to be the only satisfactory material for valve seats that would be air-tight. This was confirmed by others present who have had experience with the use of compressed air.

In relation to the air compression phase of the subject, Mr. Thurber threw some light on air pumps with which he has had considerable experience in developing his rotary starter.

For the second part of the program David F. Graham spoke on the "Practical Methods of Determining Ball and Roller Bearing sizes."

GIVING AN IDEA OF THE BRIGHTON BEACH CROWD

Low-Priced Jackson Announced

Detroit, Mich., Aug. 12—Confirmation comes from E. V. Chilson of the rumor that the Jackson Automobile Co., of Jackson, is to enter the low-priced car field in the 1914 season. Mr. Chilson, who is the manager of the Detroit branch of the Jackson, states that the new car will list at $1,385 and will include an electric starter and other equipment. The body will accommodate five passengers.

American Cyclecars Are Given Real Tests on the Road

CHICAGO, Aug. 11—First tests of three makes of cyclecar of the narrow-tread, simple type indicate that perhaps the possibilities of the new vehicles have been underestimated rather than overstated.

Though brought out by different designers and on slightly different lines, each of the vehicles, in different parts of the country, has been able to average from 20 to 30 miles an hour on country roads with comfort to the rider, this alone surprising many who have predicted failure for the movement.

The Economycar, of Indianapolis, was on the road a month ago in a more or less experimental stage, and was able to travel with reliability and speed. It was taken out on August 2 for a real trip, from Indianapolis to Attica, Ind., a distance of 83 miles by odometer. The car made the trip in the morning with no trouble, and in the afternoon was busy running about town. The return to Indianapolis was made on Sunday, the entire journey covering over 200 miles. But 6 gallons of gasoline were used during the time.

Every hill on the route, but one, was taken on high gear of 4½ to 1 and the exception was a very steep grade near Crawfordsville, well known to motorists of that section.

The comfort of the car at speed was remarkable, though it is stated that the 38-inch tread will be a little better when made slightly narrower, as it would then run a little better over a dirt road with pronounced wheel and horse tracks, one wheel running in the wheel track and one in the horse track. To meet this most of the cars so far announced are of 36-inch tread. The Wood's Autoette goes further yet in building a 30-inch tread.

This latter car, too, has been putting a good many miles behind it, and has been able to tour through the mountains about Denver with ease and safety, the inventor having but just returned from a test of the car in that region.

Another car built by Harold Eastes, of Indianapolis, was recently taken for a 20-mile trip and it is claimed averaged 30 miles an hour for the run, this over country roads. This car is to be entered for the around Lake Michigan reliability of the Chicago Motor Club. It is a side-by-side seater, fitted with chain drive and has the near-standard 36-inch tread. This makes the twelfth car announced in America with 36-inch tread.

The Imp, of Auburn, Ind., was taken out for a cross-country trip on August 3, with a six-cylinder car filled with agents and engineers following, to note the action of the car on the roughest roads that could be found, the trip being one of 20 miles to Island Park, a summer resort off the main road and at the end of a very bad road.

On the return trip the big car kept up an average of 30 miles an hour into Waterloo—10 miles of the worst road—and did not sight the cyclecar which beat the big car in by several minutes, according to the report. The entire 20-mile return trip to Auburn was made in 40 minutes running time, an even average of 30 miles per hour. There were two in the car.

The surprise of this trip was stated to be not the speed, but the exceptional action of the springing system, there being no axles on the car, the wheels fastening directly to cross springs front and rear. It is claimed that a speed of 50 miles an hour can be made with this car in comfort and on average roads.

Just what the claims for all of these cars amount to will be shown in the cyclecar trip around Lake Michigan in the run of the Chicago Motor Club, which

THE English sport coat, or sweater jacket, of llama with hood and sash to match, is a popular garment this season with the athletic woman who drives a motor car or golf ball with efficiency. The sport coat comes in four colors—navy blue, golf green, mustard and white—has patch pockets and fastens with buttons of white pearl. The sash may be worn to give a Balkan blouse effect to the coat or used as a scarf about the neck. The price of this outfit, which is shown by Mandel Bros., Chicago, is $18.50.

Another waterproof coat for men is the one of iridescent gabardine which differs slightly from the coat shown in the illustration on the opposite page in that it is longer and has slash pockets. This coat also is from the motor clothing department of Marshall Field & Co., Chicago.

organization is promoting the first American contest for cyclecars. Nine entries already have been promised for this run as follows: Downing-Detroit Cyclecar Co,. Detroit, Mich., three cars; Imp Cyclecar Co., Auburn, Ind., two; Wood's Autoetts, Chicago, one; Harold Eastes, Indianapolis, Ind., one; Stevens Cyclekar Co., Chicago, one; Carette Mfg. Co., one. The last named car has a motor slightly over the definition but will be entered if the committee and contestants agree to waive the difference on account of the newness of the industry, and the statement that the motor will be brought within the definition for later contests. It is expected that the Economy Car Co. will be represented by at least one car. Another possible entry is the cyclecar which is being built by Francis R. Hoyt, of Cleveland, O.

INVENTORS FILE PROTEST

Washington, D. C., Aug. 9—It will be of more than ordinary interest to the motor car industry to learn that the Inventors' Guild, composed of independent and experienced inventor-patentees, has, through Senator Brandegee of Connecticut, presented to the congress a series of resolutions adopted at a recent meeting, relative to pending patent legislation. These resolutions are of such importance that the senate has put them in the form of a public document. The resolution reads as follows:

Resolved, The Inventors' Guild, composed exclusively of independent and experienced inventor-patentees, does hereby respectfully ask the attention of the president of the United States to the urgent need of reforms in the patent office, and also in the courts which hear and decide patent causes; and hereby requests the president to recommend to congress the advisability of appointing a committee to confer with experienced and representative inventors with the object of promptly accomplishing such reforms as will result in more effectively carrying out the intention of the constitution; and to supplement such recommendations by such executive action as in his judgment seems likely to assist in accomplishing the needed reforms.

MORE ROADS FOR NEW HAMPSHIRE

Concord, N. H., Aug. 10—Governor Felker of New Hampshire and his executive council have just determined the route for the new highway that will cross the state from the Connecticut river to the sea. This will be one of three such roads reaching across the state running diagonally with the north and south state highways. The new one just settled upon will be longer than the others because it will be at the lower end of the state near the Massachusetts line, where the state is widest. It will start from Walpole, near the Vermont line at the western extremity, and will meet the Connecticut river road at Marlow and follow it into Keene. From Keene the highway will go southeasterly through Marlboro, Dublin, Peterborough, Temple, Wilton, Milford, Amherst, Merrimac to Nashua. Most of the above towns are popular summer resort places. From Nashua the road will run north along the Merrimac river on the Merrimac valley highway to Manchester. From that city it will go easterly around Lake Massabesic through Auburn, Candia, Raymond, Epping, Exeter, Stratham, Greenland to Portsmouth at the seacoast. S. Percy Hooker, state superintendent of highways, has received notification of the route and he has been authorized to begin work whenever he is ready.

STEWART BUILDING AIR PUMPS

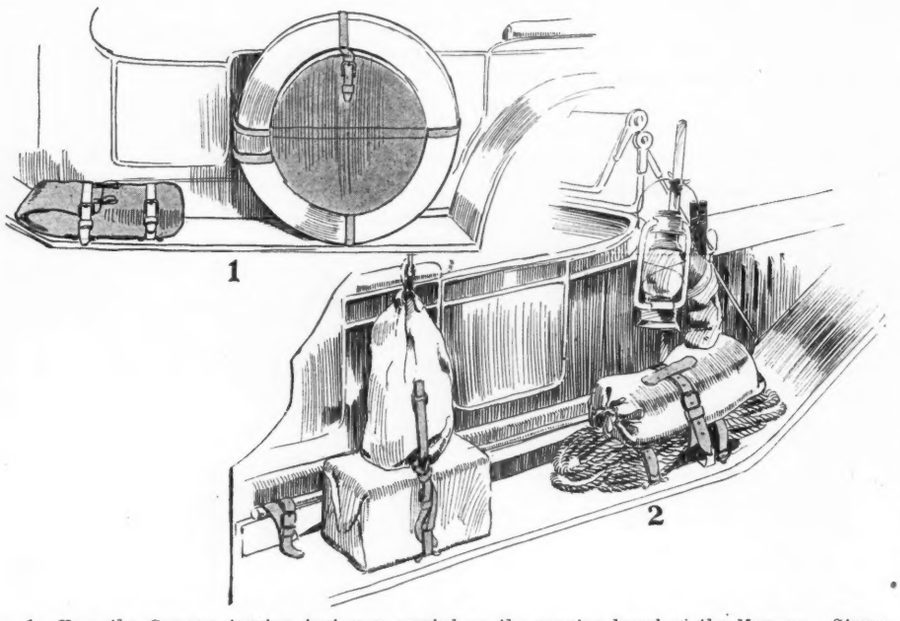
Chicago, Aug. 12—As an additional line to its speedometers, the Stewart-Warner Corp. is manufacturing at the Stewart speedometer plant at Chicago, a line of air pumps both for tire inflation and for air cranking systems. These are being produced as one, two and four-cylinder pumps. The four-cylinder pumps are to be of both the water-cooled and air-cooled types. The line includes a series of one-cylinder hand pumps, while the two and four-cylinder products are engine-driven. Samples of the new pumps have been distributed to the various Stewart-Warner branches. The corporation also has widened its speedometer field by the production of a special line of instruments for cream separators.

FOR the long-distance summer tour in the dust and occasional rain there is no combiantion more suitable for the woman motorist than the coat and hood of khaki which sells for $10 and is shown by Mandel Bros., Chicago. The coat is single-breasted with loose belted back, patch pockets and Prussian collar and fastens with large khaki buttons. The hood is pleated and has an elastic at the back to hold it closely to the wearer's head. The two ties are fastened to the hood with khaki buttons.

An importation from London for men is the indesso gabardine coat of changeable red and green waterproof material. It is knee length and has a convertible collar and turn-back cuff. The model shown in the illustration is from Marshall Field & Co., Chicago.

Picking & Packing for a Long Tour

Special devices that make for comfort of driver and passengers



1—How the Compac touring tent was carried on the running board of the Marmon. Straps through metal eyes screwed to the running board. Clothing was carried in the tire trunk. 2—Arrangement of touring equipment on Westgard's Premier; duffle bag hung from top iron and strapped to tool box; blanket roll and rope strapped to running board through metal eyes; lantern hung from spade handle; winch outfit behind tool box and blanket roll

By Darwin S. Hatch

SELECTION of the special equipment which it is necessary to carry on the car in a trip of 3,000 or 4,000 miles is one of the features of preparation which give prospective tourists greatest cause for worry. If one were to attempt to take everything which might be considered necessary to meet all conditions encountered in the wide variety of roads found on a transcontinental trip it is likely the car would be overloaded beyond the comfort of the passengers or the carrying capacity of the car.

Selection of Equipment

To make a proper selection of equipment requires actual experience in cross-country touring, such experience as has been the lot of drivers of the cars in the Indianapolis-to-the-coast tour which ended at Los Angeles August 4. Most of the drivers or entrants had been in previous tours, some of them of transcontinental scope, and their cars may be taken as criterions of the highest efficiency in special arrangements for safety and comfort on long tours where a wide variety of conditions are to be met.

It must be remembered that in this tour almost every class of road condition possible was met. In the run from Indianapolis to the coast preparations were needed for a tour of 30 days across the prairies of the middle west, three great deserts and four distinct mountain systems. Weather conditions to be expected included everything from the burning heat of the desert to the biting chill of the mountain tops.

Certain features of equipment not necessary for ordinary tours therefore, were essential and were a part of the load of every car on the run. First and most important of these are the means for carrying spare supplies of water. In the desert, where one must travel 50 miles at a stretch between water holes, their value is obvious. Not only will water be needed for drinking purposes, but the long stretches of low-gear work through sand makes it necessary to replace the cooling water frequently. In the mountains as well, it becomes necessary that supplies of water be carried, for the long, steep grades, sometimes in the bottom of a narrow box canyon, where no air stirs, uses up the cooling water rapidly. This is augmented by the fact that in the higher altitude, water boils at a much lower temperature than at sea level. Also, in the higher altitudes, the mixture invariably is over-rich, due to the thinness of the air, so that the heating is increased.

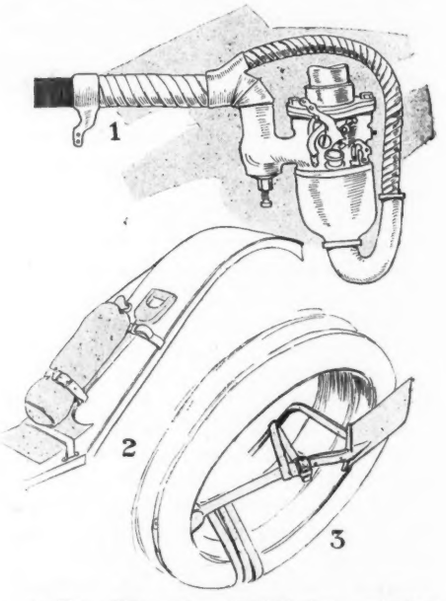
Water Bags a Necessity

The most convenient way to carry extra water supplies and one which is universal among tourists through the desert countries, is by means of water bags. These are made of closely woven canvas and hold anywhere from 1 to 5 gallons. They are closed with a cork which fits into a porcelain mouthpiece. The bags are not completely waterproof, for the evaporation of the slight quantity of water that seeps through them is relied upon to keep their contents cool. When the air is the hottest, evaporation takes place most rapidly and the water therefore always is refreshingly cool. The bags are hung on the outside of the car, usually from the top brackets.

Vaccum Bottles for Drinking Water

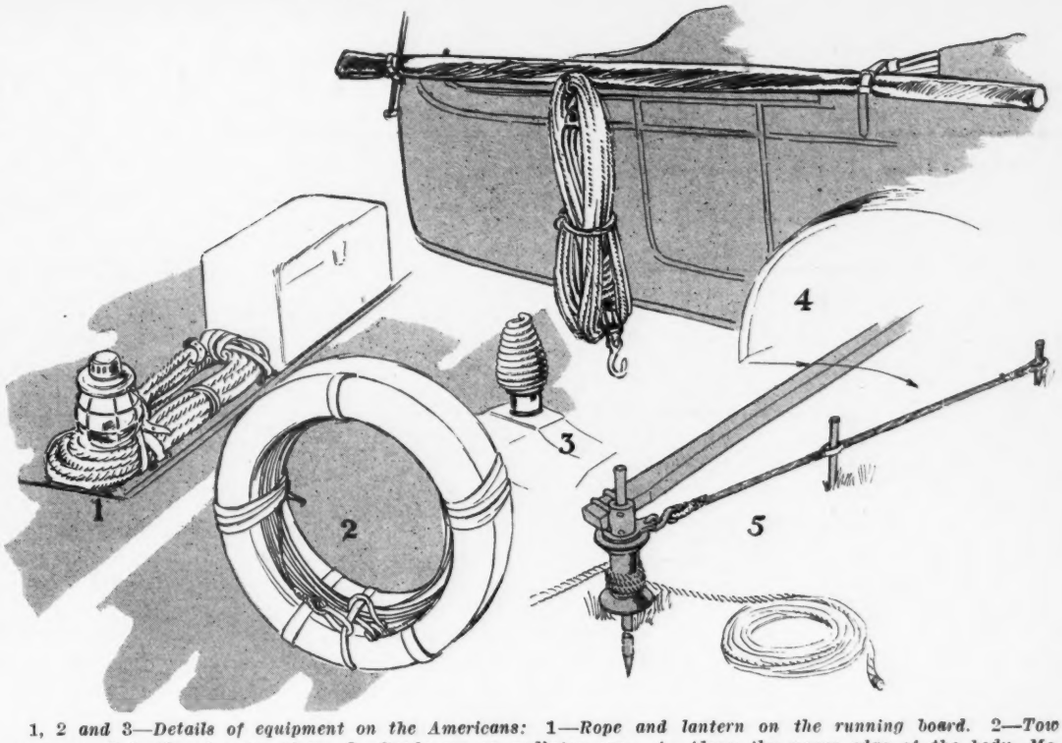
In addition to the bags, most tourists prefer to carry vacuum bottles for the drinking water. Although not actual necessities, vacuum bottles will increase the pleasure of the trip very much because in them, water retains its original temperature for days and always is much cooler than that from the bags. Also they are a measure of self-protection when it becomes necessary to fill the water bags with alkali water. Such water is much more abundant in Utah and Nevada than sweet water and can be used in the radiators in a pinch but upsets the systems of the unacclimated quite seriously when used for drinking purposes. The bottles are carried in leather cases holding one or more, although a better way is that adopted in the Marmon. In this car the bottles were carried in leather pockets on either side of the tonneau seat. A glove clasp fastened a flap cover over the bottle to keep it from bouncing out.

Next in importance to the water supply



1—How dirt was prevented from entering carbureter of Pathfinder; all the air is taken through a pipe with a screened end, one branch leading to the main air intake and the other to the auxiliary air intake. 2—Disposition of shovel and touring tent on the Premier. 3—The shovel was carried on the rear tire irons of the Marion

is the spare fuel supply. Arrangements for carrying extra fuel are essential, for it sometimes is a full day's run between points where gasoline may be obtained. Then, too, it is a matter of economy, for gasoline that sells for 45 cents a gallon at a point on the railroad costs 60 cents 75 miles inland, a 3 days' haul for a team. Probably the best arrangement is to fit the running board with special steel, hinged straps which will clamp over the can. It should be arranged to fit the 5-gallon rectangular tin cases in which much of the western gasoline is sold. The Empire has an arrangement of this sort for carrying a spare can and in addition has a special auxiliary fuel tank fitted under the cowl.



1, 2 and 3—Details of equipment on the Americans: 1—Rope and lantern on the running board. 2—Tow rope wound inside of spare tires. 3—Condenser on radiator cap. 4—Along the upper edge of the body, McNamara's Premier carried a cloth screen for stereopticon views. The block and tackle was hung to a top iron. 5—Westgard's winch set up ready to pull the car out of a hole

Of equal importance with the fuel supply on a tour of this sort is the food supply. A breakdown on the desert or in the mountains may mean a wait of a day or more before help comes and it is very comforting at such a time to realize there is plenty of rations in the locker and it will not be necessary to run down a coyote for one's dinner.

Canned foods and dried fruits and dried meats will serve. Everything must be airtight and of such shape that it will pack away without waste space. An outfit of cooking utensils of the lightest and simplest kind should be amplified by aluminum dishes. Special camping sets are most in favor with experienced tourists as they are designed to take up least space. Emergency rations in tablet form sometimes are carried as an extra precaution. This all can be packed in a chest strapped on the runningboard or in a section of a trunk at the rear.

A Prest-O-Lite Stove

Harroun's Henderson had a long chest on each runningboard. One contained the food supply and the other the extra clothing of the party. Each was fitted with an oilcloth cover which was fastened by glove clasps. In the Marions this was carried in a section of the trunk at the rear. For a stove, the Empire carried a Presto-torch fed from its lighting tanks. This would have been available as well for brazing had it been needed.

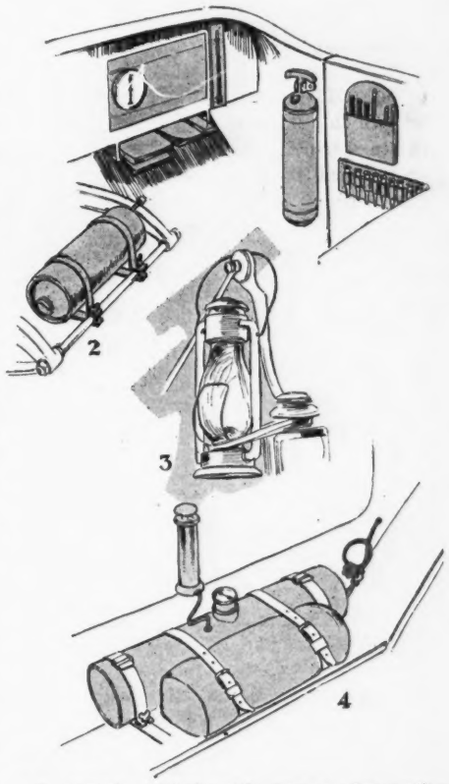
As to the heavier special tools which are needed, the list comprises, ax, spade, towline and block and tackle. The ax edge can be protected by a leather cover. The favorite method for carrying these is to strap them to the running board or fenders, through strap eyes riveted to the latter. A stout, sharp stake is a useful part of the block and tackle equipment for a tree or large rock is not always handy when the block and tackle is needed.

Camping Equipment Needed

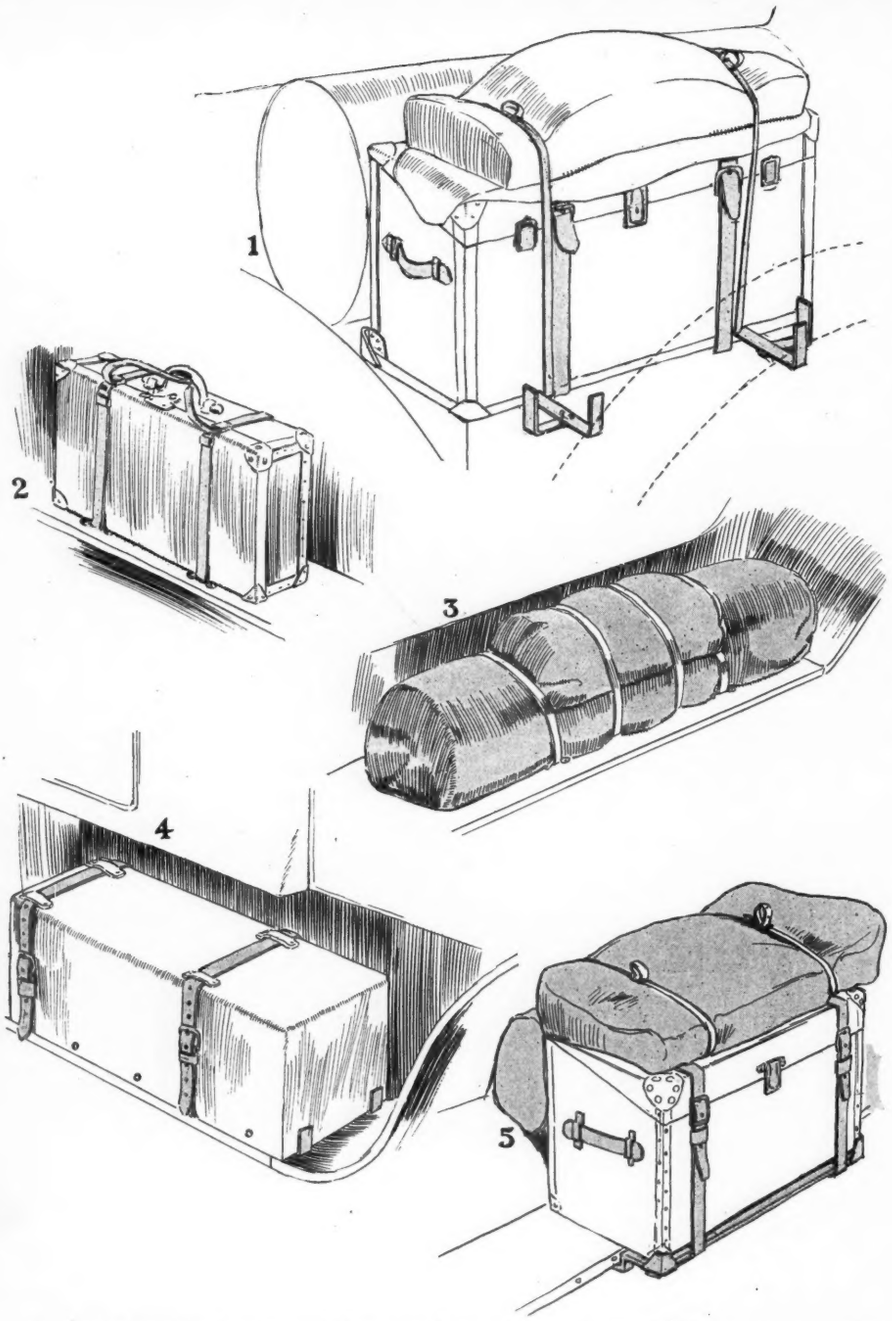
Camping equipment proper can be arranged to take up little space. Light waterproof tents which can be rolled into a bundle 4 inches in diameter and 30 inches long are most in favor on account of their compactness. These slip into a waterproof cover which keeps them dry and clean. Bedding is simple. It consists of a pair of wool blankets and a rubber blanket for each one in the party. The rubber blanket not only protects the camper but also acts as a waterproof cover for the blanket roll. For the luxurious there may be added a pneumatic pillow which folds up in the size of a pocket handkerchief when not in use.

Clothing must be of the strictly outing variety and of a color and material not affected by the dust. There should be heavy clothing, for the nights, even on the desert, are chill and in the mountains cold enough to freeze up the radiator in July. There is little use to attempt to prevent sunburn as the alkali dust produces somewhat the same effect without the sun's assistance. Oily lotions which supply the oil drawn from the skin prevent the pain of burning and prevent blisters. Camphor ice is needed to prevent cracked lips. Clothing of close weave is better than the looser weaves, for the latter allows the rays of the sun to penetrate it and permits burning through the clothing.

Rough clothing for everyday touring best can be carried in waterproof canvas



1—Premier fitted with Pyrene fire extinguisher and Westgard's special equipment for taking notes on road conditions; aneroid barometer and thermometer set in cowl, pads and pencils in a shelf under cowl with a special pencil pocket and cartridge rack on the door. 2—Pathfinder carried the Prest-O-Lite tank between the front frame horns. 3—Lantern strapped to sidelamp on Pathfinder. 4—Pathfinder's special oil tank on running board with blanket roll strapped to it. Several of the cars carried the acetylene lighting tanks at the front, as in this position they gave shorter piping to the headlights



1—Special trunk rack on rear of Marion roadster which will accommodate an extra suitcase. 2—Suitcase strapped to Marion running board through steel eyes. 3—Blanket and tent roll strapped to Haynes running board. 4—Long chest on either running board of the Hendersons; oilcloth cover fastened with curtain clasps. 5—Special trunk rack on running board of Marion touring car

bags known as duffle bags. For dress-up occasions the touring trunk or suitcase rack usually is reserved. A favorite type of waterproof coat is a very light rubber affair which slips over the head—it is more of a shirt than a coat—and collar and wrists fit tightly. To be packed away, it folds up into a very small bundle and slips into a rubber envelope 4 by 6 inches in size. Many of the drivers found that the envelope made an excellent waterproof cap.

Spare Parts and Tires

To go back to the special equipment needed for the car itself. A first thought is a plentiful supply of spare tubes. It is not necessary to load the car down with more than two extra casings because one is never more than 2 or 3 days from a town where the ordinary sizes of tires may be obtained. Spare parts to carry vary with the car and the versatility of the driver. Rear axle shafts are frequent offenders in the matter of breakdowns and a spare shaft or two often is advisable. An extra spring is one of the spare parts that often is needed and can be carried very nicely under the cross members of the frame or under the running-board apron. Wheel bushings too, sometimes are needed.

For the sake of the engine it is well to fit some sort of an indicator by which overheating will be shown before the engine gets too hot or too much water is allowed to boil away. The cars on the Hoosier tour all had either one of two different fittings for this purpose. Most of them were fitted with Motometers. These are simply thermometers screwed into the radiator cap which show the driver at a glance the temperature of the water in the cooling system.

The two Americans had a small condensing coil of copper tubing in place of the thermometer. This coil had its open end in plain sight of the driver so that the moment the water began to steam seriously the driver saw the vapor. The Pathfinder used the Motometer and a small condenser as well.

Most of the carbureters were supplied with a steering column control of the air intake. This was found to be particularly useful in crossing the mountains. The small proportion of oxygen in the atmosphere at altitudes from 8,000 to 12,000 feet made frequent changes in the air adjustment necessary, gradually giving more air as higher altitudes were reached and less air on descent.

Protection from Water and Dust

Protection of the various parts of the car from the effects of dust and water particularly is necessary. If there is not a permanent waterproof case for the magneto an oilcloth or leather one is needed. This can be attached before fording a stream or starting into sloppy mud. The most novel method of protecting the carbureter is that devised by Spiegel on the Pathfinder 40. This is illustrated on these pages. By means of a metal conduit all the air, both for the auxiliary and main intake is taken through a pipe which ends in a screen under the floorboards. The screen prevents dirt or mud getting into the air intake and its location puts it out of the way of the most of the dirt.

Lighting facilities must needs be particularly dependable on a transcontinental tour for night running sometimes is unavoidable. In the Indiana tour most of the cars were illuminated by electricity. With electric-lighted cars on a long tour, care must be taken that the charging apparatus is regulated properly because the long steady charge of day running is likely to overcharge the battery. This happened to at least one car in the Hoosier tour. One of the cars burned out some of its charging wires on account of the continuous charge, while another ran with one or more of its lights lit to prevent the same result. Several trouble lamps will be found convenient for night camps, and almost necessary in case of trouble at night.

The Marmon, Pathfinder and Empire were fitted with Prest-O-Liter systems, whereby the gas lamps are turned on and lit from the seat. The Pathfinder's wild drive to catch the tour was made in part at night and Speigel lays its success in part to the efficient illumination.

The Pilot car had electric headlights

which are arranged to illuminate not only the road straight ahead but at the same time to light the path in the direction of the front wheel upon turning a corner. By this feature, which by the way is stock equipment on the new Pilot cars, when the front wheels turn to the right the right headlamp turns but the left one remains stationary.

Oil lanterns, too, are a necessity on a transcontinental tour for they will be needed in making camp, perhaps in digging a car out of the mud in the middle of the night, etc. One of the best places to carry the lantern is on a bracket on the rear fender. It cannot be hung under the car as in the old days of the prairie schooner.

Keeping out Alkali Dust

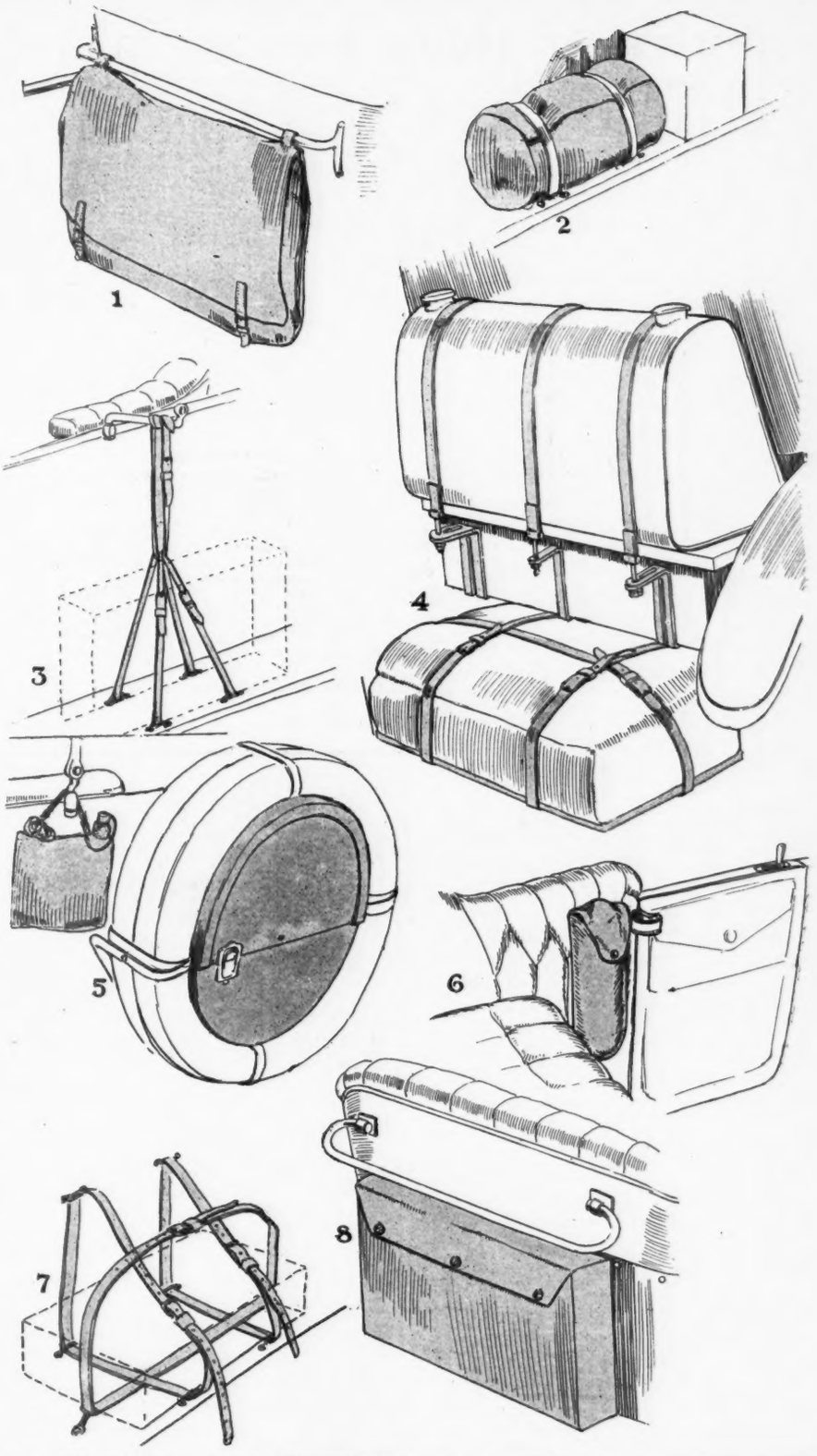
To keep out the alkali dust from the throat two of the drivers in the Hoosier tour carried sponges tied against the mouth. Others covered the mouth with handkerchiefs, but this was not as complete a success as the sponges were. An unpleasant contraction and soreness of the throat for a day or so were the only results of breathing the dust without protection. When the alkali dust settles on places where the skin is cracked it makes a sore similar to fever blisters.

Oil can be obtained whenever gasoline is sold so that a reserve gallon or so is all that is necessary.

With two exceptions, all of the cars in the tour were equipped with shock absorbers, and the rough country which was covered between Indianapolis and the coast demonstrated their usefulness. The two cars which relied on their springs unassisted were the Americans. Fourteen were equipped with Truffault-Hartford absorbers, one with Mondex, one with Connecticut and one with J-M shock absorbers.

The four-cylinder Henderson had the only novelty in the way of wheel and tire equipment. It had McCue wire wheels, being the only one supplied with metal spokes. The tires themselves were unusually large, being 6 inches in section although only 34 inches in diameter. Instead of the 80 to 90 pounds air pressure usually carried, Harroun had these tires pumped up to only 30 pounds in the front and 35 pounds in the rear. The combination of wire wheels, large tires and low air pressure made the car particularly easy riding. The large tires made the negotiation of deep sand easier than it otherwise would have been because they did not sink into the sand. It is probable, though, that the large tires cut down the economy somewhat on good roads.

A definite list of the equipment necessary should be made up before the tour is started so that the tourists will not discover that something important has been omitted when it is too late. Below is a sample list of equipment which might be followed for a transcontinental tour of four persons.



1—Robe rail bag on rear of Apperson's front seat. 2—Blanket roll on Apperson running board. 3—Provisions for carrying an extra suitcase on the Apperson. 4—Steel straps on McFarlan fuel tank. 5—Water bag and tire trunk on McFarlan. 6—Leather pocket for vacuum bottle on Marmon. 7 and 8—Luggage carrying facilities on McFarlan

One touring tent with waterproof cover.
Four pairs of woolen blankets.
Four rubber blankets.
One touring trunk holding four suitcases.
Four 2-gallon water bags.
One runningboard chest with aluminum dishes and canned food.
Two vacuum bottles.
Two duffle bags.
Four pair of goggles with amber lenses.
One robe rail bag.
Two spare casings, tubes and tire repairs.
Two jacks and several broad wood blocks to rest them on.
One block and tackle with stout sharpened stake.
One each of spade, axe and oil lantern.
Spare springs, and other parts with complete set of tools.
Assortment of ignition, lighting and binding wires and straps.
Camphor ice and cold cream.

Answers to Route Inquiries from Motor Age Readers

Memphis, Tenn.-Asheville, N. C.

ARKANSAS CITY, ARK.—Editor Motor Age—Please give a report on condition of roads from Memphis to Asheville, N. C. —C. E. Hyde.

Your route to Asheville from Memphis goes via Tuscombia 159 m., Birmingham 139 m., Atlanta 190 m., Greenville 188 m., Asheville 60 m.

In the first part of your trip, especially to Birmingham, you will find very little road improvement outside of the larger cities; although at this time of the year you should have no difficulty in getting through, you may encounter numerous small fords. From Atlanta to Asheville a great deal of road improvement has been effected.

Lancaster, Wis.-Monticello, Ind.

Bloomington, Wis.—Editor Motor Age—Kindly give me the route from Lancaster, Wis., to Monticello, Ind.—Albert Loewensohn.

From Lancaster go south 33 m. to East Dubuque, passing through Rockville, Potosi and Keeler. At East Dubuque come east 92 m. to Rockford, passing through Hazel Green, Schullsburg, Warren and Freeport. The first part of this route, especially as far as Schullsburg, is very hilly. The only way to avoid that section is to come clear down to Clinton and that route, too, is quite hilly, although road conditions are a little better.

From Rockford to Chicago, 88 m., you will find good roads, passing through Belvidere, Marengo and Elgin; Chicago to Monticello, Ind., 118 m., your route is almost directly south through East Chicago, Crown Point, Thayer, Rensselaer, Remington and Wolcott.

Chicago to Duluth

Chicago.—Editor Motor Age—Kindly advise the best route from Chicago to Duluth, Minn., taking into consideration present road conditions and scenery.—Dr. S. Kuh.

You will get your scenic country by taking the road to Dubuque, then following the river to Prairie du Chien, La Crosse and Minneapolis. The 183 miles to Dubuque is a day's run and takes you by way of Oak Park, Addison, Elgin, Marengo, Garden Prairie, Belvidere, Cherry Valley, Rockford, Freeport, Warren, Shullsburg, and Hazel Green. It is 168 miles to La Crosse with exceptionally fine views of the surrounding country by routing through Dyersville, McGregor, Prairie du Chien, Mt. Sterling, Viroqua, and Middle Ridge. St. Paul is a distance of 162 miles, the run being through Ridgeway, Witoka, Winona, Lewiston, Utica, St. Charles, Rochester, Pine Island, Zumbrota, and Cannon Falls.

Follow one of the boulevard roads to Minneapolis and the run to Duluth is 185 miles. This will in all probability take you two days, making the first day's travel through Sunrise, Rush City, Rock Creek, Hinkley and Sandstone, and the second day will be through Rutledge, Willow River, Sturgeon Lake, Moos Lake, Barnum, Mahtowa, and Carlton.

To Coast and Return

Grandfield, Okla.—Editor Motor Age—I am planning on going to the coast in a Studebaker and we want to go via Denver, to the Yellowstone national park, then west to the coast, on down to San Francisco, to Los Angeles, through Arizona, New Mexico and Texas, and back home.—P. K. Owen.

Considerable work has been done on putting in condition the short cut through Texas to Amarillo, and rather than route away north to Wichita, Kans., and then over the Santa Fe trail to Denver, you can make the run to Randlett, cross the Red river to Burkburnett and encounter the short-cut at Wichita Falls, and route through Vernon, Quanah, Childress, Memphis, Clarendon, Amarillo, Dumas, Ruby, Straford, and across the Panhandle of Oklahoma to Lamar, on the Santa Fe trail, heading west to Las Animas, La Junta and Pueblo, thence north to Denver via Bragdon, Colorado Springs, Pike's Peak, Monument, Palmer Lake and Littleton. To reach Cheyenne, Wyo., you will travel 117 m. through Henderson, Brighton, Platteville, Greeley, Eaton, Pierce and Dover.

Turning west the 132 m. to Medicine Bow is through Granite canyon, Tie Siding, Red Buttes and Laramie. The Medicine Bow-Rock Springs road of 186 m. is somewhat better than last year, as after reaching Table Rock from Hanna, Ft. Steele, Rawlins, Wamsutter, Red Desert and Tipton follow the signs on the new road to Point of Rocks and continue on to Rock Springs. Evanston is then 121 m., running through Green River, Bryan, Granger, Liman, Ft. Bridger and Spring Valley and then making a connection at Tremonton for the balance of the routing given in the Minot, N. D., routing in the issue of July 3, page 23, by a run of 124 m. through Castle Rock, Emery, Echo, Devil's Slide and the Weber canyon to Ogden, Brigham City and Deweyville.

Information on the run to Yellowstone Park was given in the issue of August 6.

The run over the Borderland trail from Los Angeles takes you to San Diego, thence east by way of El Centro, Imperial, Brawley, Glamis, Ogilby and Yuma, 207 m., to Phoenix, following the course of the Gila river through Gila, Agua Caliente, Arlington and Liberty; Phoenix to Tucson, 126 m. via Florence and Represso; Tucson to Douglas, 139 m. via Herford and Don Louis; Douglas to Deming, 160 m. via Apache, Lordsburg and Continental Divide; Deming to El Paso, 94 m. via Afton, Canutillo and Montoya Siding. The Borderland follows through New Mexico into Texas via Las Cruces, Alamogordo, Ruidosa, Hondo, Roswell and Broncho, going to Amarillo through the towns of Plains, Gomez, Brownsville, Lubbock, Abernathy, Hale Center, Plainview, and north through Happy and Canyon to Amarillo.

Jasper, Ala.-Amory, Miss.

Jasper, Ala.—Editor Motor Age—Please give me the route to Amory, Miss., also the route to Columbus, Miss., via Corona and Fayette, Ala.—R. Y. Long.

There is no tourable road charted in any route guide which Motor Age has in its files in this section of Alabama and Mississippi, but in a general way it seems that a road to Columbus via Corona and Fayette, then to Amory, would be the best plan to pursue in making a start through this country. Communications from any readers who can give assistance in this respect will be welcomed.

Cushing, Okla.-Alberta, Can.

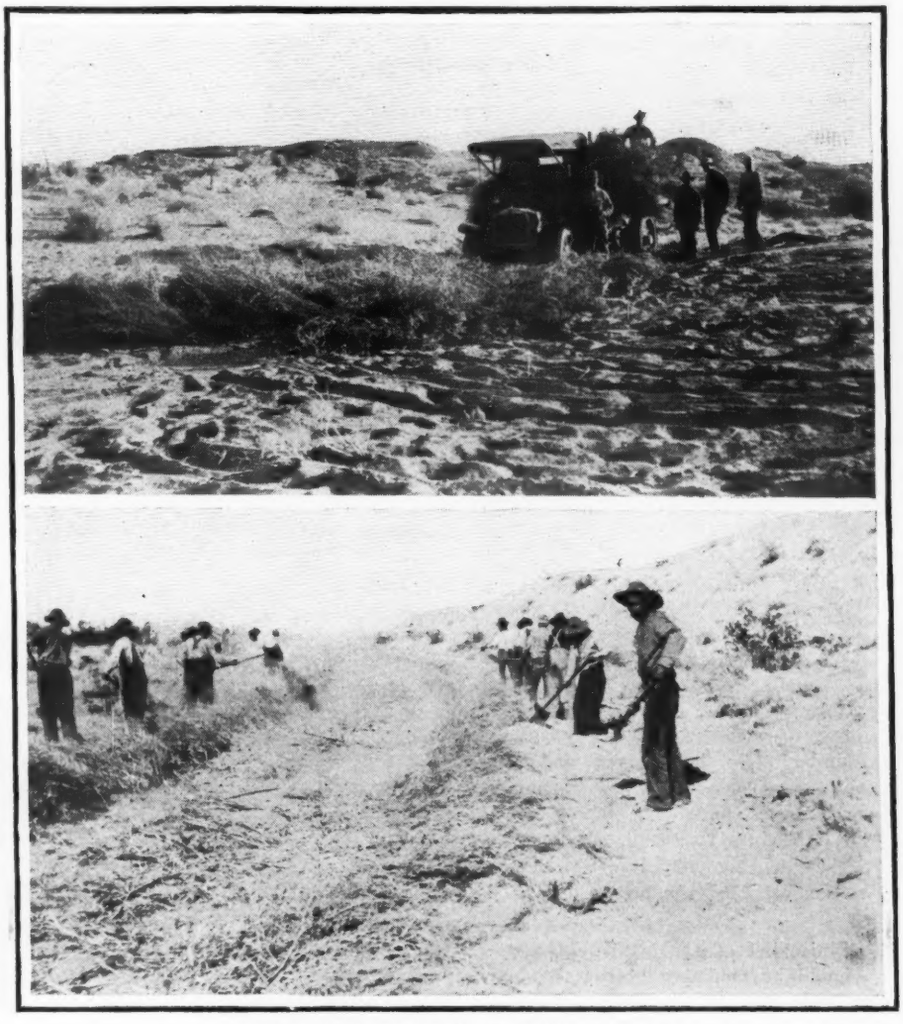
Cushing, Okla.—Editor Motor Age—I understand Motor Age has guides of routes all over the world. I want to go to southern Alberta, Canada, if possible. I don't want a big book, just a map.—Ed Bechtel.

Motor Age does not attempt to give specific route directions. For such data we refer you to the various volumes of the Automobile Blue Book. Motor Age, through its routes and touring department, is in constant touch with general road conditions in various sections of the country and tries in every possible way to assist its readers in planning their various tours by giving, in a general way, the towns passed through and approximate distances.

On your proposed trip into Alberta, Can., you should have no serious difficulty, especially as far north as Grand Forks or Winnipeg, if you go that way.

The first few miles of your route Motor Age has no specific information on, although if there is a bridge across the Cimarron river you should be able to go on a direct line to Perry via Stillwater; if not, you will probably have to come to Guthrie. From Perry to Wichita, Kans., is 130 m., via Ponca City, Arkansas City and Winfield; from Wichita go almost straight north, following the line of the Meridian road all the way. Wichita to Salina 101 m., via Newton; Salina to Belleville 79 m., via Concordia; Belleville to Columbus, Nebr., 129 m., via York; Columbus to Yankton, 121 m., via Norfolk; Yankton to Watertown 171 m., via Bridgewater and Alexandria; Watertown to Fargo 176 m., via White Rock; Fargo to Grand Forks 95 m., via Hillsboro.

From here on you have a choice of two routes. You can go to Winnipeg, 159 m., and from there west to Alberta, following the line of the Canadian Pacific practically all the way, or you can go west along the line of the Great Northern through Devils Lake, 99 m.; Berthold, 162 m.; Culbertson, 167 m.; Malta, 187 m., and Harve, 213 m. From either Berthold or Harve you can go



ROAD BUILDING IN THE ARIZONA DESERT

The upper illustration shows weeds spread over road before it was completed. The lower illustration shows the Mexicans shoveling sand on the weeds

north and west into Alberta, depending upon your exact destination. We wish to warn you, however, after leaving Devils Lake you are going into a very unsettled section where there's practically no motor travel except in the larger towns; you have long distances between towns and certain sections of road are not even permanently established, with particularly dangerous parts in western North Dakota and eastern Montana.

St. Marys, O.-Los Angeles, Cal.

St. Marys, O.—Editor Motor Age—What is the best route for the fall of the year to Los Angeles, Cal.—Charles Wirtz.

If you are starting after September 1st Motor Age would advise your following what is generally known as the southern route, your first objective point being St. Louis. Motor Age advises the following route:

St. Marys to Indianapolis, 137 m., via Salina, Portland, Dunkirk, Muncie and Anderson; Indianapolis to Terre Haute, 70 m., following the National road through Plainfield, Reelsville and Brazil; Terre Haute to St. Louis, 173 m., via Marshall, Casey, Effingham, Vandalia, Greenville and Collinsville.

From St. Louis follow the official Cross-state highway to Columbia, 141 m., passing through St. Charles, Warrenton, New Florence and Fulton; Columbia to Kansas City, 159 m. via Franklin, Booneville, Marshall, Lexington and Independence.

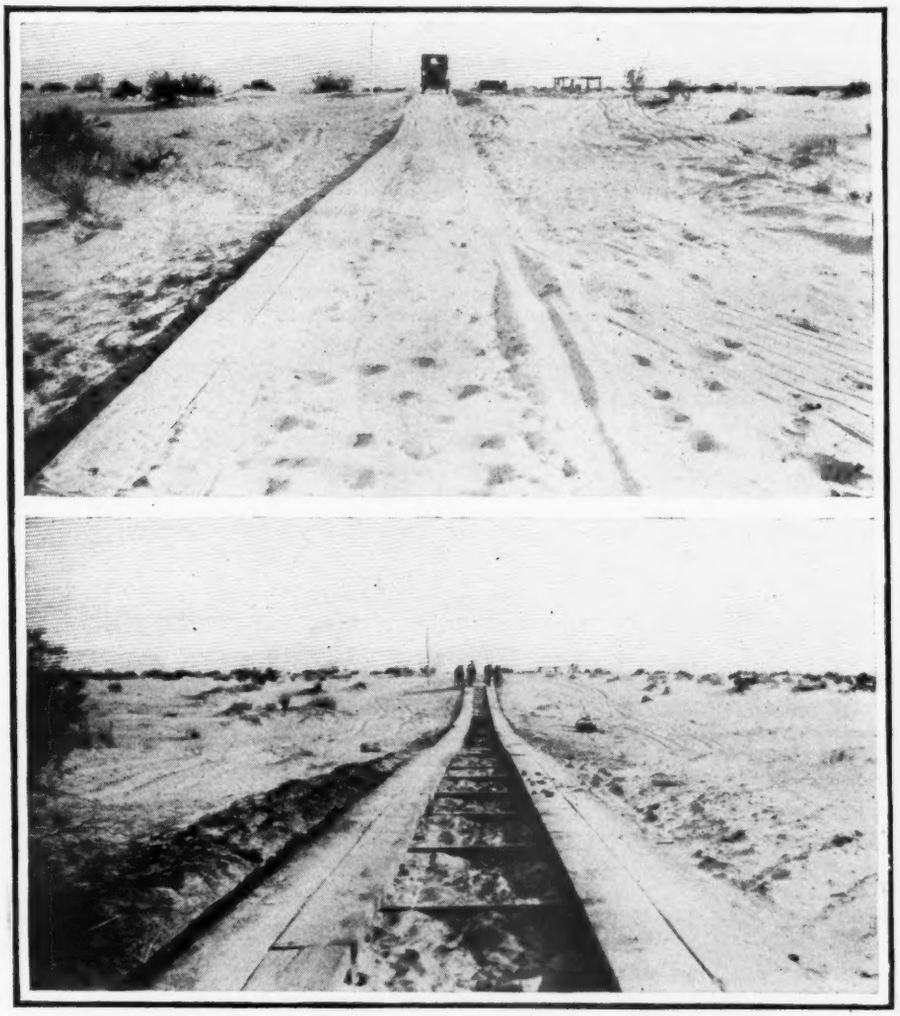
You can follow the new Santa Fe trail to Dodge City, which extends through Shawnee, Lenexa, Pleasant View, Olathe, Garnder, Scranton, Burlingame, Osage City, Allen, Council Grove, Delevan, Herington, Lost Springs, Marion, McPherson, Conway, Winton, Lyons, Chase, Ellinwood, Great Bend, Pawnee Rock, Larned, Garfield, Kinsley, Offerle and Wright. At Dodge City you branch off on the Borderland cut-off and the run is 288 m. to Amarillo through Rhinehart, Fowler, Plains, Springfield, Liberal, Guymon, Goodwell, Texhoma, Stratford and Dumas; then 204 m. to Brownfield by way of Canyon City, Happy, Plainview, Abernathy and Lubbock. Routing to El Paso the run is through New Mexico and the mileage to Roswell, 148 m. through Gomez and Broncho; to Alamogordo, 124 m. through Sunset ranch, Picache, Hondo, Ruidosa; 115 m. to El Paso, through Las Cruces and Canutillo.

Solve Problem of Desert Road Building

REMARKABLE results in desert road building have been secured by W. A. Horrell, of Phoenix, state agent for Mack and Saurer trucks. He and his associates in the Santa Fe-Blythe Motor Transit Co. have accomplished wonders on the great Mojave desert, just across the western Arizona border in California.

The distance from Blythe Junction, on the Santa Fe Railroad, to the town of Blythe itself is 40 miles. That 40 miles lie across the Mojave desert, where the sands in many places are shifted constantly by the winds. Horrell knew that he would have to overcome those dry sands and he set about it in a new, original way entirely his own.

The three most difficult miles of the entire route lie across a sand wash, just out of Blythe. These 3 miles have been bridged with the only desert plank road in the world.



GOOD ROADS ACROSS THE ARIZONA DESERT

The upper illustration shows the desert road ready for use. The lower illustration a lumber road just after the boards are laid

A base of railroad ties first was laid over the sand. Toward each end of the ties two planks, each 3 inches thick, 12 inches wide and anywhere from 10 to 24 feet long, were laid end on end, with the joints broken to overcome roughness as much as possible. This made 24 inches of trackage on each side, with a 60-inch tread between.

When the boards were laid sand was shoveled in between the ties. The boards then were oiled to prevent wear. Regular truck service has been given over that road for several months and the boards have not shown a sign of wear, with the exception of a few defective ones.

The plank road cost $1,500 a mile and no one can say how long it will last. Horrell says that the cost of similar road in other localities would not be nearly so great. Owing to the high freight rates, lumber costs $37 a thousand feet laid down at Blythe.

Nearer the Colorado Horrell laid a mile and a half of permanent road with a base of arrow-weeds cut from the river bottom. It cost only $80 a mile. Arrow-weeds were laid down on the sand and then a heavy thickness of straw was put on. Sand and gravel were then thrown on the straw. Cheap Mexican labor was used.

Macadam is the only other road material that would have sufficed for these two bad stretches between Blythe and Blythe Junction, Horrell says. The cost would have been prohibitive, as nothing less than a 12-inch base would have overcome the moving sands.

Two Saurer trucks are now hauling freight from the junction to the town and one Mack handles passengers. The Mack makes the trip in 2 hours and each Saurer a round trip a day.

Formerly the journey, one way, required 5 hours by motor car, as it was very difficult for machines to make their way through the shifting sands. It often took a week for a team of mules to make the round trip. The charge for freighting was $20 a ton, and the Santa Fe-Blythe Motor Transit Co. now gives quicker, better service for $7.50 a ton.

Under a new California law this company has been recognized as a common carrier. This is the first time that motor trucks have ever been listed as common carriers. Hereafter the Atchison, Topeka and Santa Fe Railway Co. will publish rates to Blythe as well as Blythe Junction.

Horrell is now preparing a booklet on desert road building which will be published shortly by the Automobile Club of Southern California.

Watts Made Branch Manager

Chicago, Aug. 11—L. A. Watts, secretary of the Chicago Motor Club, has resigned his office because of his change in business location. He has been appointed manager of the Dallas, Tex., branch of the Republic Rubber Co., and will leave for the southwest this week.

One Overland Chassis and Three Body Types for 1914

FEATURES OF THE OVERLAND FOR 1914

New car is listed at $950 *fully equipped*
Motor bore increased from 4 *to* 4 1-8 *inches*
New type of quick removable valve plunger
Gear pump adopted which supplants the oiler of 1913
Clutch spinning stopped by the use of a brake
New type of accelerator pedal
U-shaped doors and clean running boards

STANDARDIZED production is still further emphasized in the Overland for 1914, for while two models of chassis were offered last season, the entire factory will be given over to the making of but a single model for the coming year. There will be three types of bodies fitted to this chassis—a five-passenger touring car, a roadster and a coupe.

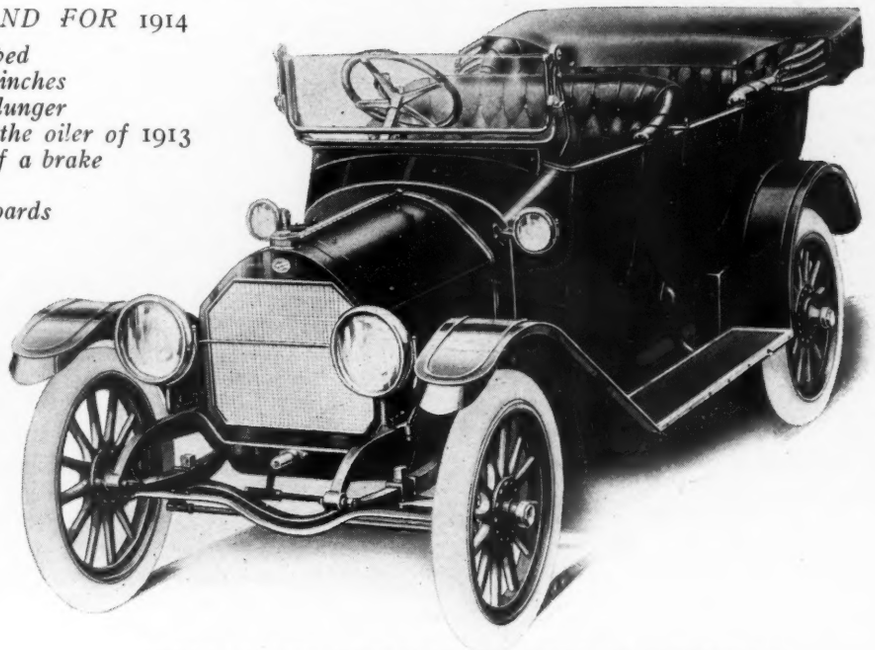
The new model, which is designated as model 79 really is a continuation of last season's 69 with several changes. This was the cheaper of last year's line, while model 71, the more expensive of the two, has been dropped. In fact, the new 79 is listed slightly lower than its predecessor, which carried a price tag of $985. To be exact, the new car is listed at $950 with a most generous equipment. When supplied with an electric cranking outfit, the additional cost is $125.

Rear Axle Gearset Retained

The new model retains the fundamental features characteristic of Overland design, although body appearance has been refined and brought up to the minute in style. The cylinders are cast singly; the gearset remains in unit with the rear axle; right drive and center control are employed; the rear axle is of the so-called three-quarter floating type.

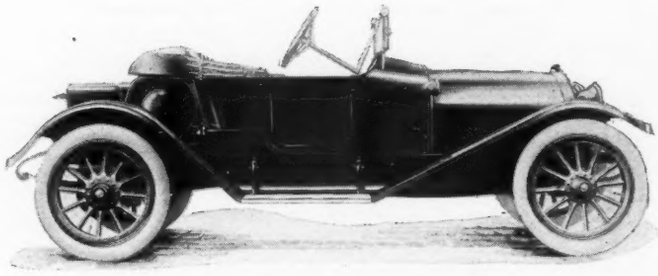
However, the bore of the cylinders has been slightly increased from 4 to 4⅛ inches. The stroke remains the same as that of model 69, namely, 4½ inches. With these cylinder dimensions, the power plant develops approximately 35 horsepower at normal speed, according to the Overland engineers. The cylinders have L-heads, valves all being on the left. A new type of valve plunger is incorporated, which is easily removable. A yoke or dog which bolts at its center to the crankcase clamps each set of two plungers for each cylinder in place, so that by removing this yoke the plungers may be readily slipped out for adjustment or other purposes.

The model 79 motor also appears without the oiler which was attached to the motor of type 69. Instead, a gear pump has been added which takes care of the lubrication. This is by splash, the pump supplying the oil to the connecting rod troughs through four oil leads. From the troughs, the oil flows down into the bottom of the crankcase, and after being filtered is forced back through a sight feed on the dash and on to the troughs again.



THREE-QUARTER VIEW MODEL 79 OVERLAND TOURING CAR

Looking at the manifolding, the intake has been reduced in size. Both this and the exhaust header are located on the left side, the latter occupying a position above the intake. Neither of these is provided with flanges for fastening to the cylinders, but a yoke provided with a single bolt clamps each cylinder's pair of inlet and exhaust connections in place. This makes removal and replacement easy.

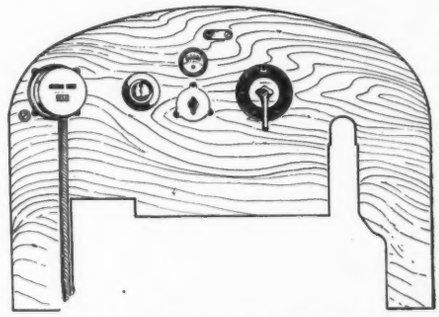


A ROADSTER OF CLEAN DESIGN
Has a wheelbase of 114 *inches and sells for* $950 *fully equipped*

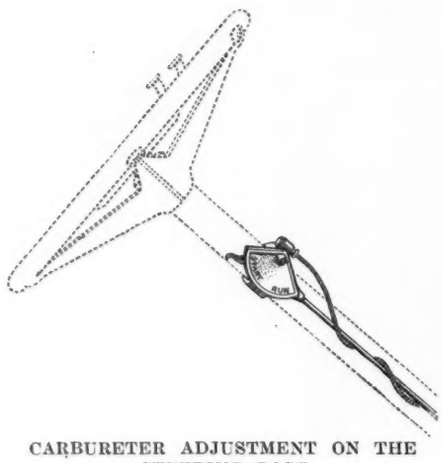
Pressed Steel for Crankcase

Another point of difference is found in the use of pressed steel for the lower half of the crankcase instead of the generally adopted aluminum. However, no change in the design of this part is to be noted. The motor is suspended at two points at the rear by means of integral crankcase arms which rest upon frame members running diagonally from the side frame rails to the cross brace back of the motor.

At the front end the engine rests upon another cross member riveted to the frame.



DASH ARRANGEMENT OF THE NEW OVERLAND
Showing the kick switch, speedometer set at an angle so as to be readible easily, and the sight feed



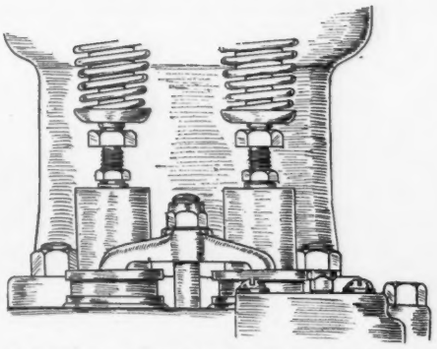
CARBURETER ADJUSTMENT ON THE STEERING POST
To facilitate starting the handle is turned upward, and after getting under way it is turned to "run"

The crankshaft is mounted on five main bearings of the plain type. The rear bearing is much longer than the other four for obvious reasons, it having a length of 3⅛ inches, while the others measure 1¾ inch each. The connecting rod lower bearings are also 1¾ inch in length. The camshaft is carried on three bearings similar in construction to the crankshaft supports.

New Type of Ignition

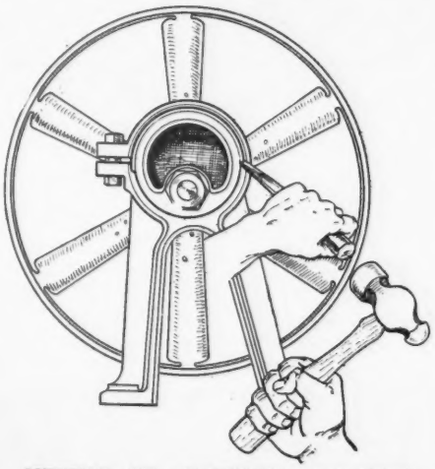
The motor also appears with a new type of ignition, a Splitdorf magneto with a coil for the dry cells providing a dual system to replace that formerly employed on model 69. Model R Schebler carbureter also is used this year, a different model of the same make having been equipped heretofore.

Other new equipment which though not standard in one sense, still may be regarded as such, is the Gray & Davis cranking system, which is included at a slightly increased cost. Due to the present demand for self-cranking cars, it is probable that the greater part of those leaving the factory will carry with them this added feature of comfort. The Gray & Davis system consists of two units, an electric motor and a generator. In the Overland installation, these are fitted to the intake side of the engine on brackets which are a part of the crankcase. They are driven through silent chains from the front end of the crankshaft, as inspection of the illustration of the left side of the engine will show.



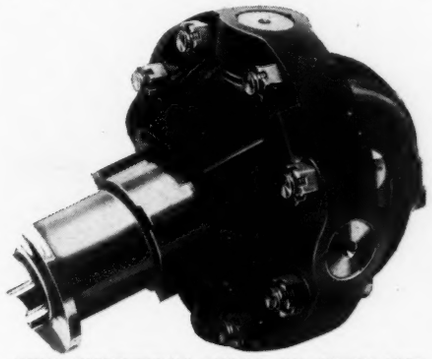
ANOTHER OVERLAND REFINEMENT FOR 1914

Removable valve plungers which are held in place by yokes as shown



METHOD OF ADJUSTING FAN BELT

The eccentric carrying fan and pulley shaft may be turned to give the desired distance between pulley centers



NEW UNIVERSAL JOINT ON OVERLAND

This ring and slip joint is said to be made entirely from drop forgings

Briefly, the generator which is driven whenever the engine is running charges the storage battery which in turn gives out its energy for driving the electric motor when it is required to turn the crankshaft for starting. Suitable cutouts and switches prevent the overcharging of the storage battery, provide for the sending of the generator current direct to the lights at night when the generator voltage has reached a certain height due to the engine speed and connect the storage battery current with the lights when the engine is not running at night. A centrifugal governor is a part of the Gray & Davis apparatus whereby the armature speed of the generator is maintained practically constant above a given speed of the driving gasoline motor. The cranking operation consists of switching on the ignition current after which the starter pedal is pushed to turn the crankshaft.

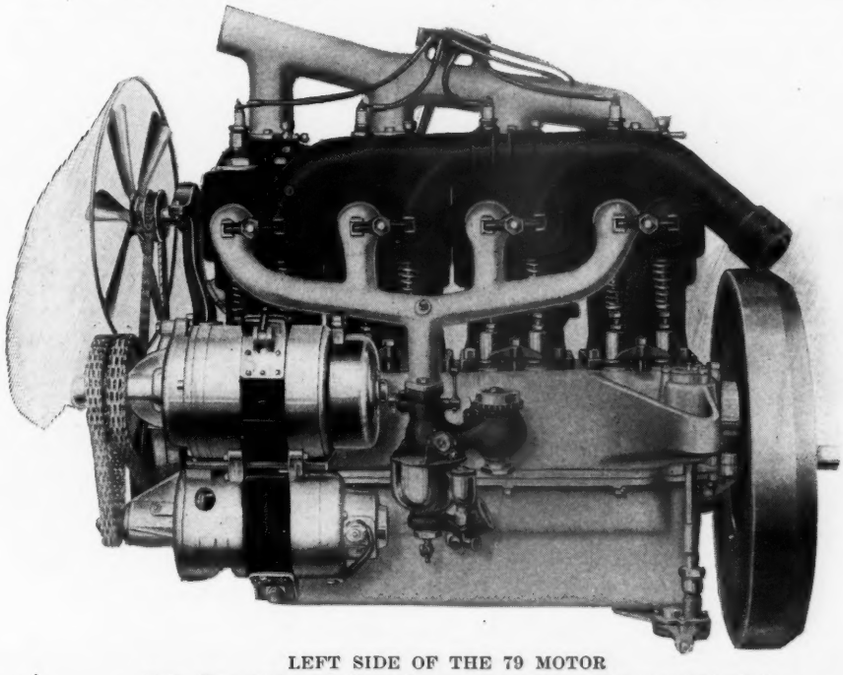
Radiator Tubes Enlarged

Thermo-syphon cooling is retained, the radiator being the same as that employed on last season's model 71, although the tubes have been enlarged. Cooling is further augmented by the extra large water pipes for both inlet and outlet of the water. The fan belt now appears in the V-shape, a flat belt being used heretofore. Special interest attaches to the Overland method of adjusting the fan belt tension by means of an eccentric mounting of the shaft carrying fan and pulley. This eccentric is carried in a bracket which is fastened to the crankcase and not the forward cylinder. To adjust the belt tension, it only is necessary to loosen the bolt which tightens the band around the eccentric and then to turn the latter until the desired distance between pulleys has been obtained.

Within the flywheel is the cone clutch, leather-faced, which has a new attachment in the form of a clutch brake interconnected with the clutch pedal. Thus, when the clutch is disengaged, the pressing of the pedal throws on this brake which stops it from spinning, thereby preventing noisy gear changes. If the clutch has not ceased to rotate when the gears are shifted, a certain amount of grinding of the gear teeth must result in order to stop their moving before other teeth will mesh.

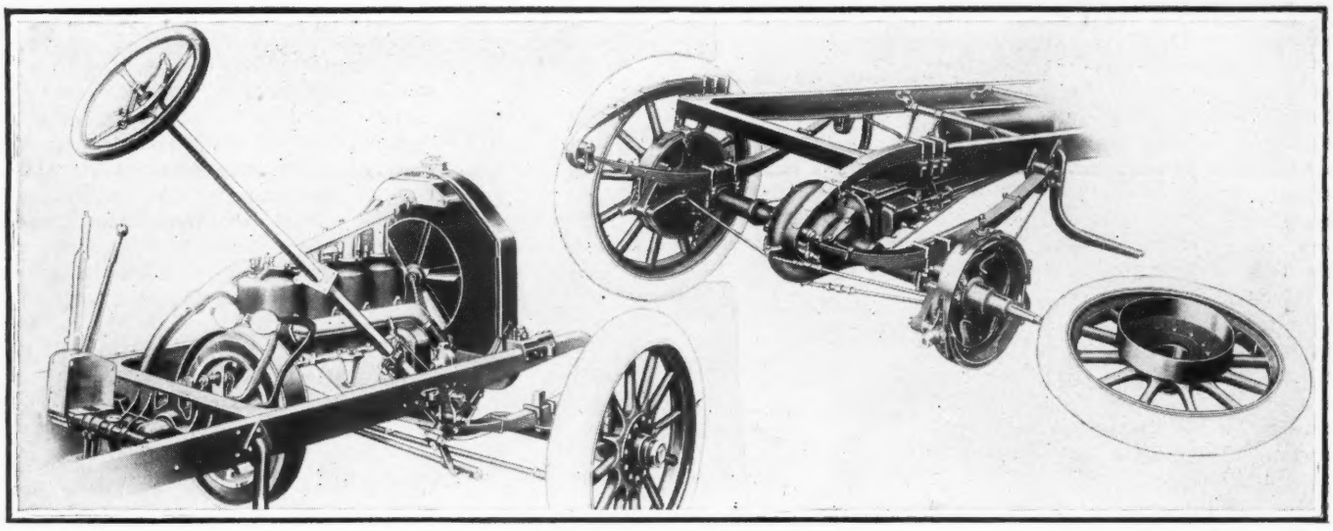
The drive shaft is inclosed within a torsion tube which is yoked at its forward end, its two arms being hinged to the frame cross member to allow for variations of the axle position with respect to the frame since the tube bolts to the gearbox at its rear end and this in turn is rigidly bolted to the axle housing. To assist in the maintaining of the proper position of the rear axle, radius rods run from the forward end of this torsion tube back to the ends of the rear axle.

In accord with general practice where a torsion tube incloses the propeller shaft,



LEFT SIDE OF THE 79 MOTOR

Note the position of the starter which drives through silent chain



SOME CHASSIS DETAILS OF THE 1914 OVERLAND

To the left is shown a forward view. Note the right drive and center control To the right is shown the brake construction. The bands are 13 inches diameter

a single universal joint at the forward end of the shaft is fitted. On the new model 79 Overland this member is the same in construction as that used on model 71 of last year. The ring and slip joint are made entirely from drop forged parts.

The gearbox, of characteristic Overland design, bolts through flanges to the axle housing and to the torsion tube as already mentioned. The gearset of selective, sliding gear type affords three forward speeds and reverse, the gears being shifted by a center gearshift. The main and countershafts within the gearbox are made as short as possible which obviates any chance of their springing. Imported annular ball bearings appear throughout the gearset.

Floating Rear Axle Used

The rear axle, a three-quarter floating type, is carried on Hyatt spiral roller bearings. The three-quarter construction is so called because the inner end of the axle shaft floats entirely, while the outer end next to the wheel is partially floating.

The steering, on the right, is by means of an adjustable worm-and-gear type with the housing anchored to the side frame rail instead of to the cross member, as was formerly done. The column also has been made larger, while the wheel has been increased to 18 inches in diameter. Control is standard in every way. No muffler cut-out is supplied, however, it being deemed unnecessary by the manufacturer. On the column and below the wheel is a lever for throttling the carbureter air for starting.

The operation of the accelerator pedal also has been changed in that it is now made to press inward instead of sliding.

Due to the lengthening of the wheelbase by 4 inches over that of the model 69, type 79 is afforded a longer and more rangy body both in appearance and in actual room for the passengers. The wheelbase is 114 inches, and the increased length is given to the body almost entirely, only ¾ inch being added to the length of the hood.

The clean running board and smooth sided effect is very pronounced, door handles being removed from the outside as well as all other unnecessary details. The fenders are crowned and rivetless—a new feature for Overlands which lends much to the appearance. The rear wheel fenders follow the line of the wheels completely, while the front fenders slope away conventionally to meet the long running boards.

The doors, too, are changed, they now being of full U-shape. In general the body sides are ¼ inch higher than formerly.

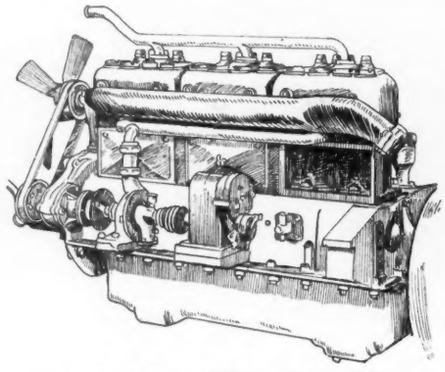
New Rutenber Motor Is Announced

Has Silent-Chain Starter Drive

A NEW six-cylinder motor of 3¾-inch bore and 5¼-inch stroke is announced by the Rutenber Motor Co., Marion, Ind. Evolved from the model 28, this new motor, has a number of desirable features, chief among which is the silent-chain starter drive. Accommodations for the starter are made at the right side of the motor, the chain running to the crankshaft gear directly. The starting shaft is geared to operate at a ratio of 1½ to 1. The flywheel type of starter may be used, in which case the starter shaft may be used for operating a tire pump or other device.

The cylinders are of the L-head type, cast in pairs, the valves being on the left side. Another feature of this motor is the removable valve stem guides. The pistons are machined both inside and out and are made as light as present day practice will permit. The crankcase is of an aluminum alloy. The camshaft is of forged steel and has integral cams. The front and center bearings are 2¼ inches, die-cast, a double row, ball thrust bearing being provided on the rear end.

By making the connecting rods 12 inches long, side thrust on the cylinder wall and wear on the bushing at the upper end of the connecting rod, is reduced. The valves are 1 27-32-inch diameter and are made of nickel steel, the stems being of carbon steel.



New six-cylinder Rutenber motor which has silent chain starter drive

Lubrication is by means of two plunger pumps, driven by eccentric straps from the camshaft. These pumps draw oil from a sump, the oil in its path passing through fine mesh screens which cleanses it. The oil is pumped through copper tubes to all gears and main bearings and also to individual connecting rod troughs. These troughs supply lubricant to the pistons, cylinders and other parts.

Any make of magneto may be used, a platform being provided for its installation on the left side of the motor. The water pump is also on this side, the carbureter and starter being on the right side.

Partin-Palmer Newcomer in Low-Price Field for 1914

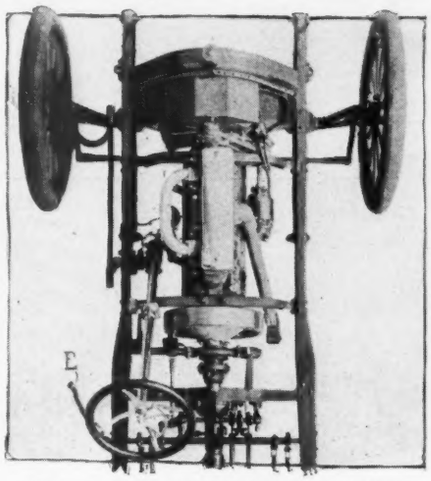
Five-Passenger Car Listed at $975

FEATURES OF THE PARTIN-PALMER 38

Removable cylinder head.
Valves in the head inclosed.
Rear axle gearset.
Left drive, center control.
Clean running boards.

ANNOUNCEMENT is made by the Partin Mfg. Co., Chicago of the introduction of the Partin-Palmer 38, a five-passenger car manufactured at the Detroit factory of the company and selling for $975. At the price mentioned the 115-inch wheelbase newcomer leaves the factory with complete equipment, including top, curtains, windshield, speedometer, Prest-O-lite tank, full set of lights, etc.

One of the most important features of this comparatively new product of Detroit is the motor. This is of the valve-in-the-head type with the valve mechanism inclosed, making for extreme silence. The removable cylinder head is another characteristic, this feature having been adopted by a number of makers of motors of the block type.

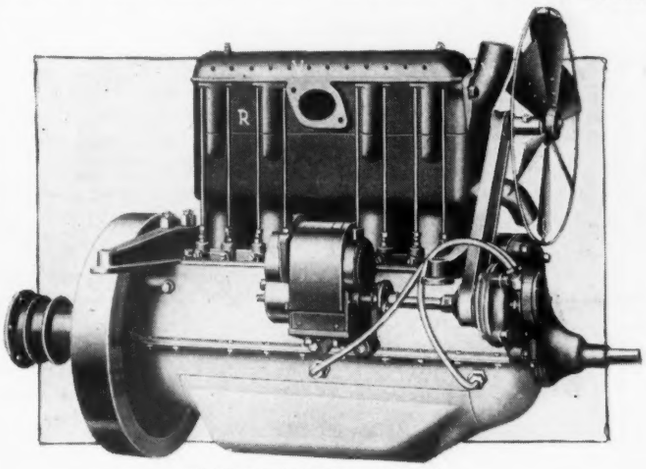


VIEW OF FORWARD END OF PARTIN-PALMER

Note the auxiliary fuel tank behind the radiator and the emergency brake E on the left side

The cylinders are cast in block with the upper half of the crankcase. A glance at the illustration of the motor, shown on this page, will bring out the unit idea so well accomplished in this motor. The water outlet is bolted to the front end of the first cylinder head in order that the head may be removed without disturbing the radiator connections. This and other motor features tend to show that the designers had in view simplicity as well as rigidity.

The spark plugs are set in the head casting at an angle. The exhaust manifold is integral with the head, the outlet being through a single pipe of straight line design directly to the muffler. This eliminates back pressure due to angularity of the exhaust pipe. The intake enters through the opposite side of the same casting. Valve inspection is a simple matter requiring the removal of the head only, in which case the pistons and cylinders may be inspected at the same time. The pistons and connecting rods may be removed through the top of the cylinder in a comparatively short time.



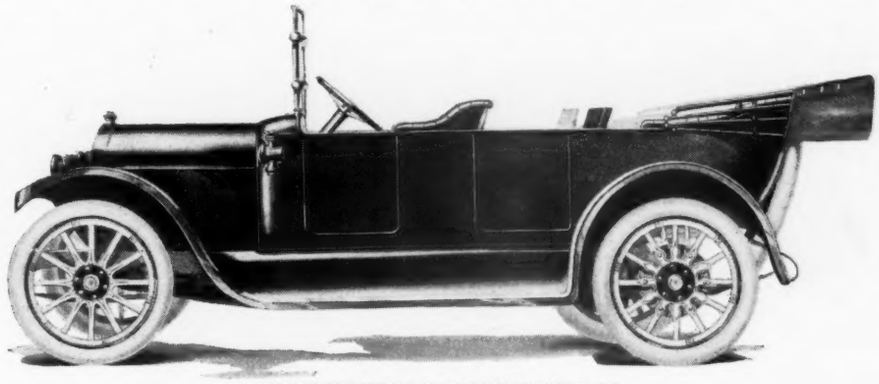
INTAKE SIDE OF MOTOR

The cover V protects the valves from dirt. The removable cylinder head R and the water connection W are other features

Thermo-syphon cooling has been adopted and the circulating splash method of lubrication. It is said that the oil pump used will circulate 1½ gallons of oil per minute at normal speeds.

A Stromberg carbureter and Briggs dual ignition is used. The carbureter is fed from a 14-gallon tank under the front seat, an auxiliary tank being carried under the hood and behind the radiator.

The drive is through a cone clutch with leather face, then through a 3-speed selective gearset to a three-quarters floating rear axle. It is to be noted that the gearset is a unit with the rear axle, which construction is considered by some makers more advantageous than the amidships construction. Steering is by a post of the worm and gear type located on the left side of the chassis, the control levers being in the center operative with the right hand.



SIX-PASSENGER PARTIN-PALMER 38

With full equipment this 115-inch wheelbase car sells for $975

PEROXIDE IN GASOLINE

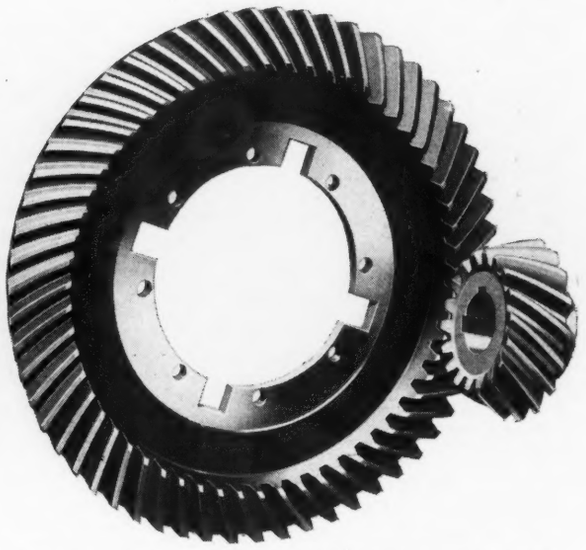
A new use has been found for hydrogen peroxide, a chemical which heretofore has been considered to have its principal value in the manufacture of blondes. To George B. Selden, of Rochester, N. Y., so much in the limelight a few years ago in connection with basic motor car patent rulings, is due the credit for a discovery that may cause as much of a flurry in the fuel situation, as his earlier efforts did in the motor car manufacturing industry.

Selden's latest contribution is the discovery, that if kerosene is treated with peroxide of hydrogen, it burns freely and completely in the cylinders, causing no smoke or smell in the exhaust, and forming no deposit. Further, that ordinary carbureters can be used, if they give a sufficiently wide range of air adjustment, and exhaust gas can be used for heating them. As the incomplete combustion of the raw kerosene, with the attendant carbonization and smoking has been the chief obstacle in using the cheaper fuel in gasoline engines, this development may give kerosene a much wider use. As to the cost of the treatment, it is stated that this is little more than the labor of handling.

Theoretically, the complete combustion of fuels as a result of treatment with peroxide of hydrogen is to be expected, for when it is decomposed by heat it gives off quantities of oxygen which unite with the fuel proper.

Worm Bevel Gears Are Latest Innovation in Packard 38

TESTING PACKARD WORM BEVEL GEARS FOR HARDNESS WITH DIAMOND POINT WHICH STRIKES A 75,000-POUND BLOW



PACKARD WORM BEVEL GEAR AND PINION SHOWING SHAPE OF TEETH

ONE of the chief features of the new Packard 38 which is to be announced shortly is a novel type of gear design for the final drive in the rear axle. This is a combination of the worm and bevel designs upon which the gear cutting department of the factory has been working for some time.

Since 1899, when the prototype of the present Packard car was put on the market, Packard engineers have been searching for a noiseless type of gear. The "man who owned one" told them that the rear axle was exceptionally free from noise. But they were not satisfied. The years of experiment and persistent effort have produced the worm bevel gears and patents have been applied for.

From one of the illustrations, it will be seen that there is a large gear and a pinion with bevel faces as in the ordinary type, but instead of being straight, the teeth are those of a worm gear. The worm bevels have done away with the backlash, that looseness between the teeth of straight gears which causes commotion in the differential housing. Instead of having only the limited contact afforded by the straight bevel, the teeth of the worm bevel are curved so as to have one set of teeth enmeshing while the set adjoining is becoming disengaged. This affords a much more nearly continuous contact and promotes a smooth sliding action between the bevel gear and the pinion.

The hair-line accuracy required to perfect the worm bevel gears means that the machining and workmanship must be accurate to the uttermost limit. Each operation in the course of manufacture is inspected by experts armed with instruments capable of measuring to .00025 inch.

After the gear has been cut and hardened there follows a series of the most severe tests to which a gear can be submitted. A small drop hammer with a diamond point falls upon the teeth with a force of 75,000 pounds to the square inch and rebounds. The hardness of the steel is indicated by the height of the rebound as shown on a perpendicular scale. At least thirty readings are taken from each gear. Also, a heavy hammer of known weight drops upon each tooth of every gear. If the gears pass these tests they are considered capable of withstanding any strain to which they could be put in the course of ordinary usage.

NEW PEERLESS BODY

Body innovations in the new series of closed cars have just been announced by the Peerless Motor Car Company. The window area on all sides has been increased. All frames and casements have been eliminated by the use of the Swiss railway type of window—a heavy plate glass which moves up and down in a groove. The side and inner compartment windows are raised and lowered by straps. Those in the side doors are moved by a special patented device when a handle similar to that on a safe, is turned about. In the new cars a patented auxiliary seat is used which is controlled exclusively by the Peerless company. When they are not in use these seats fold up and completely disappear in a recess in the inner compartment wall, leaving the rear compartment entirely open and free from the usual encumbrances. The backs of these seats are adjustable and may be raised or lowered for the convenience of tall or short passengers. They are extremely comfortable.

Regular seats in both the front and rear compartments are of the Turkish roll type extremely deep and stuffed with the highest grade of pure hair. Another touch of up-to-dateness is given to the fittings by the installation of Pullman type interior electric lights, which disappear into the wall. Touch a button and the light turns about into the open—touch another and it disappears leaving only a polished and ornamental silver plate in its place. An electric telephone or chou-phone replaces the speaking tube for communicating with driver.

A passenger in the rear compartment can see with perfect clearness into the street ahead. The driver, about to make a turn can see with equal clearness into the street behind. The 45-degree mirror no longer is necessary for this purpose. The doors are hung so that they open practically flat against the body and yet they cannot touch it. The full width of the opening is available for passengers entering or leaving the car. Electric lights concealed on the door frame just above the step light automatically when the door is opened to illuminate the step for anyone entering or leaving the car. The top of the body is curved and the exterior appearance of the whole construction is one of great beauty. These Peerless closed bodies are mounted on three chassis, 38-six, 48-six and 60-six. They are made in the limousine, berline-limousine, landaulet and coupe types.

REMY COMPANY CHANGES

Chicago, Aug. 11—E. R. Vincent, formerly state agent of the Baker electric and located at Indianapolis, has been appointed manager of the Chicago branch of the Remy Electric Co. Fred J. Urban, sales manager of Remy Electric Co., has removed headquarters from Chicago to the factory.

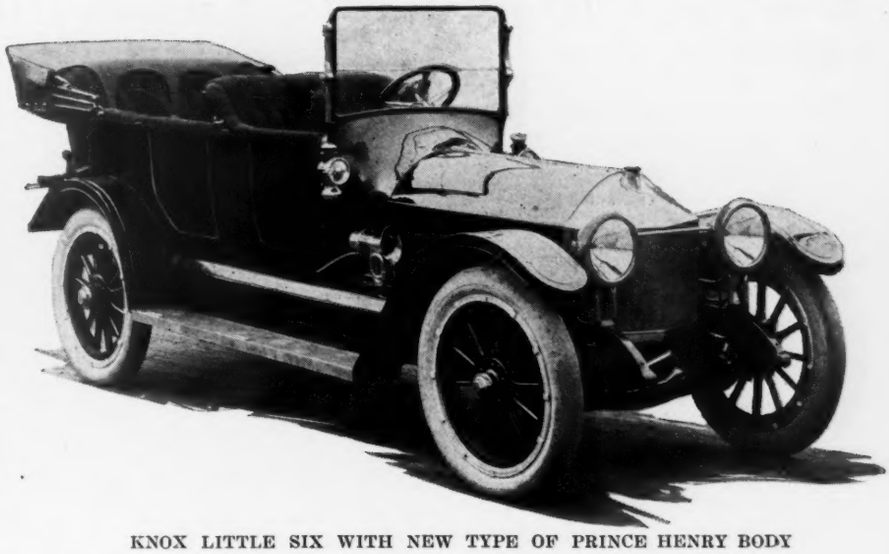
Four Knox Chassis Is the Offering for Next Season

FOUR Knox chassis are to be marketed for 1914, a reduction in price being noted on all but the model 46, which is the small six-cylinder car. This will sell for $4,500 as last year but the other cars have been reduced $300. A new type of body has been placed in the little six.

In the matter of chassis changes, no important ones are to be noted. The two four-cylinder cars, the 44 and 45 are of the same bore and stroke; namely, 5 by 5½ inches, and the motor details are the same in both instances. The cylinders are cast separately and have the valves in the head, a well known Knox construction. Double ignition is continued, the magneto being of Bosch make. Carburetion is by Stromberg, the fuel being fed by gravity. The Berdon electric cranking system is still to be seen on Knox cars.

The drive from the motor is by a disk clutch, through a three-speed selective gearset, made a unit with the motor, and thence to a floating rear axle. On the model 45 the steering location is optional with the purchaser, but on the 44 the steering is placed on the right side as stock, the shifter lever being located in the center. The wheelbase of the 44 is 122 inches while that of the 45 is 126 inches.

The two six-cylinder models are called respectively the little six and big six. The former has motor of 4.38 by 5.5 bore and stroke and the latter 5.0 by 5.5 inches. The model 46 is line stock-equipped with a Rayfield carbureter. The wheelbase of both sixes is 134 inches and in other respects these cars are the same, except for tire size and steering location. On the little six the steering location is optional with the purchaser, but on the big six it is placed on the right side.



KNOX LITTLE SIX WITH NEW TYPE OF PRINCE HENRY BODY

TEXAS TRADESMAN KILLED

Dallas, Tex., Aug. 11—George L. Fetzer, Texas manager for the Marathon Automobile Co., was killed in an elevator accident Saturday night at the company's plant in Dallas. He was one of the best known dealers in Texas.

Manufacturers' Communications

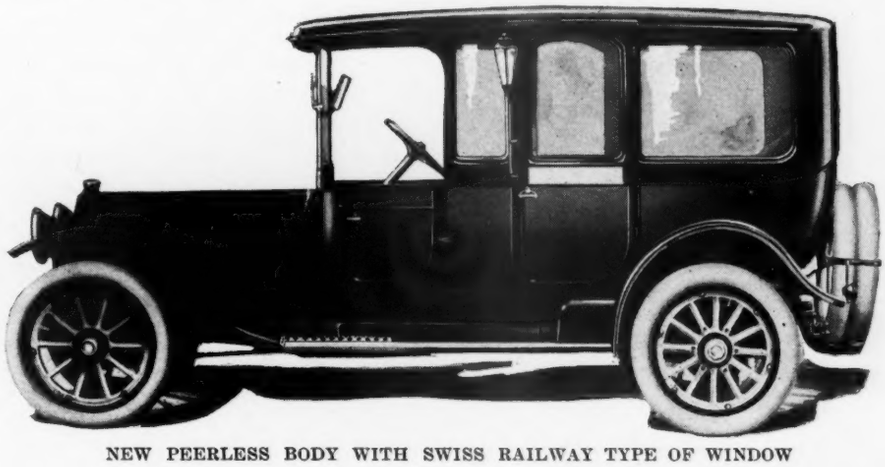
ALTITUDE AND THE MOTOMETER

NEW YORK—Editor Motor Age—In Motor Age July 17, in connection with the account of the Indiana-Pacific tour, the following item appeared: "By the time the cars had reached the top of Floyd hill, 30 miles out, the grade combined with the altitude had all the radiators boiling, although the Motometer showed a temperature of only 185 degrees in the cooling water."

This statement is rather ambiguous. It is quite possible that the Motor Age correspondent desired to convey the idea of extreme altitude but in expressing the same it might appear to readers that the motometer was inaccurate. We therefore beg to call attention to the directions issued with all Boyce Motometers. "In operating this instrument in altitudes above sea level it should be noted that an allowance of 2 degrees should be deducted for each 1,000 feet in altitude, thus at an altitude of 10,000 feet the boiling point of water becomes approximately 190 degrees instead of 212 degrees, sea level boiling point."

As the altitude of Floyd hill is about 12,000 feet we think this explains the apparent discrepancy. This is not only true of the Motometer but true of all thermometers and as every Boyce Motometer undergoes the most careful test at the Taylor Instrument Co. before shipping, the boiling point as recorded is absolutely correct. This point is always indicated when steam is produced in the radiator. However, we beg to call attention to the fact that the Motometer does not employ a submerged bulb and therefore that the temperatures before steam is produced are always slightly cooler than the water at the top of the radiator.

We have found this method of construction to be the only practical means of indicating the average temperature for the whole radiator. Also with a submerged bulb it is impossible to note any perceptible rise in temperature between 200 degrees, a good operating temperature, and 212, steaming, a dangerous operating temperature. Incidentally, with a submerged bulb the Motometer does not act as a low water alarm for if the radiator leaks, leaving the bulb suddenly exposed to the air the instrument would record improved cooling conditions when the reverse is actually the case.—Motometer Co., George H. Townsend II.



NEW PEERLESS BODY WITH SWISS RAILWAY TYPE OF WINDOW

WILLYS BUYS CASTLE PLANT

Detroit, Mich., Aug. 11—The assets of the Castle Lamp Co., of Battle Creek, Mich., have been purchased by John N. Willys. It is planned to move the machinery and stock of material to Toledo, where the manufacture of lamps will be carried on for the Overland company.

The Readers' Clearing House

REASON FOR DISHING OF WHEELS

Camber and Gather Defined — Types of Wheels Illustrated

KOKOMO, IND.—Editor Motor Age—Please explain the principle of camber and gather, also the theory of wheel-setting, and illustrate. —X. Y. Z.

Let us first define the terms dish, camber and gather so there will be no confusion in the following text.

Dished wheels are those in which the spokes run from the hub at an angle as shown in Fig. 2 at B. Cambered wheels are those whose upper portions are farther apart than their lower portions, as shown at A. Gathered wheels are those whose front portions are closer together than their rear portions, as illustrated at C in Fig. 2.

Now that we have definite conceptions of these different types of wheels, the reason for using them and the principles involved will be discussed.

Dished wheels were evolved in carriage practice to enable a pair of wheels to withstand sidestrain, due to centrifugal force when taking turns. Due to the angularity of the spokes the shock is transmitted through the spokes and partly through the spindle collar, so that the latter absorbs some of the strain.

It is clear, then, that dishing the spokes makes a wheel more adaptable to cars whose wheels must of necessity withstand sidestrain, and the wheels of a motor car are called upon to do this every moment.

If a dished wheel is set on a horizontal spindle, as shown in Fig. 1, at the left, the vertical stress would be along the line XY. But to obtain the greatest strength the line of action should be X1-Y1, or in a straight line with the spoke. In order to accomplish this, the wheel is cambered as shown at the right, which brings the stress along the line X2-Y2, or in a direct line with the spoke. Not only is the load then carried properly, but the point where the wheel rests on the ground is brought more nearly under the steering spindle, which makes for easier steering and at the same time reduces strain on the steering mechanism.

However, a dished wheel that is cambered has a tendency to grind the tires, by not making a true rolling contact with the road. To overcome this difficulty the wheels are gathered, or toed-in as it is sometimes called. Wheels properly cambered and gathered will run with a true rolling contact and in a straight line.

There is one type of wheel in use on motor cars which has not been taken up. It is called the artillery wheel and is defined as one with spokes set straight instead of dished. It is open to question whether such wheels should be cambered and gathered. Camber without gather has been found to be scientifically false, because such a wheel on a motor car would cause the tire thereon to wear on one side. As stated before, the gather eliminates the grinding and produces a true rolling contact. Artillery wheels are cambered by some makers for the reason that when so set the spokes of the inner wheel will resist the strain due to rounding curves.

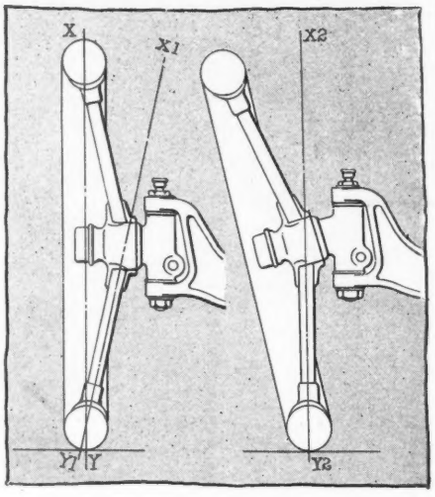


FIG. 1—REASON FOR CAMBERING OF FRONT WHEELS

INFORMATION ON ROTARY MOTOR

No Mufflers Fitted—Castor Oil for Lubricant—Suction Operated

Snyder, Tex.—Editor Motor Age—Kindly give the working principle of a four-cylinder rotary motor, the one commonly used on biplanes and monoplanes.—George H. Brown.

These motors ordinarily have seven cylinders arranged radially about a central steel crankcase, and are air-cooled. The crank of the motor stands still, and the cylinders revolve. Thus, the cylinders, revolving about the shaft, are in perfect balance and the pistons also, since they revolve about the crankpin. The only difference is in the angularity of the pistons as they move toward and away from each other as they traverse the length of the cylinder.

The exhaust valves of these motors are in the cylinder head, and the intake in the piston, balanced with a counterweight so that the momentum does not disturb timing. They are suction-operated. The gas is taken in through the hollow crankshaft into the crankcase and from there sucked into the cylinders through the pistons.

No mufflers are fitted. Oil is fed into the crankcase, and only castor oil is used, since it refuses to mix with gasoline and will not foul plugs. These engines are wonderfully reliable, powerful for the weight, yet very inefficient and noisy. The head resistance they offer also is great and a drawback on fast aeroplanes. As yet no rotating motors of this type have been used on motor cars in any quantities, owing to the necessity of departing from standard car practice in fitting them.

Questions Answered and Communications Received.

X. Y. Z.	Kokomo, Ind.
George H. Brown	Snyder, Tex.
Subscriber	North Platte, Neb.
X. Y. Z.	Mt. Carmel, Ill.
Joseph Lesmeister	Harvey, N. D.
William R. Haish	Hinckley, Ill.
R. W. Arnold	Berwick, N. D.
John H. Thomas	Pettus, Tex.
H. Holmgreen	San Antonio, Tex.
E. H. K.	St. Louis, Mo.
William Watts	Ypsilanti, Mich.
Will Taylor	Shreveport, La.
N. A. Girard	Pawhuska, Okla.
Henry Field	Shenandoah, Ia.

Cyclecar Section

F. R. Simpson	Chicago
C. H. Lacey	Anderson, Ind.
Rollo Benham	Albion, Mich.
J. H. Crawford	Deadwood, S. D.
W. B. K.	Little Rock, Ark.

COMPARING TWO STUDEBAKER CARS

Four More Economical Than the Six of the Same Weight

North Platte, Nebr.—Editor Motor Age—The Studebaker 35 and the Studebaker 6 are identical, except the motors are different and there is a difference in weight. The bodies are the same. One has a four-cylinder motor with a piston displacement of 267.3 cubic inches and the other has a six-cylinder motor with a piston displacement of 288.6 cubic inches. These are nearly the same in piston displacement and the cars are so similar that they present a good opportunity for comparison of the motors. If one were to choose between these two cars, the choice would depend entirely upon the motor.

What would be the difference in the cost of operation and particularly with reference to gasoline consumption of these two motors carrying the same load over any given distance over the same road conditions? That is, compare their efficiency. If the six-cylinder motor is much more expensive to operate, why?—Subscriber.

The six cylinder Studebaker being of greater displacement than the four and the two cars being of practically the same weight and having the same gear ratio and tire size, it is evident that the model 35 will be more economical to operate. The cost of operation of the six may be indefinitely stated as being 15 per cent greater than that of the four.

AMERICAN STEEL EQUALS FOREIGN

Castor Oil Not to Be Used in Average Car —Cork Harmful to Gears

Mt. Carmel, Ill.—Editor Motor Age—Who handles F & S ball bearings?

2—Where is the Aeoleus compound pump made?

3—How can one decide when ball bearings need replacement?

4—Is castor oil for motor lubrication preferable to other brands of lubricant?

5—Is cork finely ground or fine fibre good to quiet transmissions? What proportion?

6—Is American steel considered as good as the foreign for motor construction?

7—Is the latest tendency toward ball or roller bearings both at home and abroad?

8—Who makes the transmission on the Willys six?

9—Why was this model discontinued?—X. Y. Z.

1—Bretz & Co., New York, handle F & S bearings.

2—The Aeolus pump is made by the Bridgeport Brass Co., Bridgeport, Conn.

3—If there is too much play between balls and the race. If one of the balls is crushed only that ball need be replaced.

4—No. It is considered best by some drivers of racing cars.

5—No. When gears are noisy, due to worn teeth, they should be replaced.

6—Yes.

7—Roller bearings are coming into use more than ever before, but to say which has the greater number of followers is difficult just at this time.

8—The Willys six gearset was made by Warner Gear Co., Muncie, Ind.

9—The demand for the smaller model was so great that the factory could not handle the six.

WATER BOILS IN NEW OLDSMOBILE

Not Probable That New Car Has Valves Out of Time

Harvey, N. D.—Editor Motor Age—What adjustments must be made to overcome the heating and boiling of water in a new Oldsmobile Limited 6-60? The condition of the motor is excellent, it is brand new and has run only about 300 miles in demonstrating. The water pump and system are in good working order, the spark plugs are clean and properly adjusted; there is no carbon whatever on the pistons or valves which are perfectly tight. The motor runs both smoothly and fast, does not misfire under any conditions, develops full power and I can see no reason for the water becoming steaming hot within a few miles' running. The last and only cause we can detect is the mixture, which we have adjusted several times, but with little difference, if any at all. As stated before, the motor fires regularly, either idling or on the road, and develops full power.

2—To whom can we refer, with the exception of the Willys-Overland Co., about the Pope-Toledo motor car, model 17 motor?—Joseph Lesmeister.

1—It is rather unusual for a new car without carbon in the cylinders and with the water pump and the rest of the system in good working order, to overheat so quickly. At the Chicago service station of the Oldsmobile company a number of such cases were found and the cause was quickly ascertained as a rich mixture. You state, however, that the mixture is right.

Motor Age suggests that you do the following: Let the motor idle. Then decrease the adjustment of spray nozzle until the motor will operate fastest without missing. In other words, try to give the motor as little fuel as possible for a given amount of air. If this does not help see that the fan is running properly. Note if it slips, for slipping of the fan tends to heat the motor. In some instances a great amount of water has been expelled through the radiator overflow, due to motor racing. See that there is no water loss in this direction. Do not operate the motor with too much oil for this will tend to cause excessive heat. Keep the spark advanced as far as possible and as much as possible without causing a knock.

2—The Auto Salvage Parts Co., Chicago.

WIRE WHEELS DECREASE TIRE WEAR

Experiments Performed Abroad Show a Saving of 70 Per Cent

Hinckley, Ill.—Editor Motor Age—Which will use the most gas, a four or six-cylinder motor of the same piston displacement, say about 450 cubic inches, is each placed in the same car and tested out?

2—Are wire wheels considered as durable as wooden wheels for country use on a touring car? Are they harder or easier on tires?—William R. Haish.

The design of the two motors would determine this. A given four-cylinder motor may be more economical than the six and vice versa. Granting that in both cases the design is the same, the six no doubt would consume more fuel than the four. The frictional resistance of the parts would undoubtedly be greater than the four. At the same speed, under which conditions you would conduct the test, the power output of the two would be different, hence to obtain the same output one engine must be run at a different speed than the other, in which case they will have different fuel consumption figures. It would be found that the six would use more fuel than the four in nearly every instance.

2—Some consider wire wheels better able to withstand hard usage, while others claim they will not stand up. The results of tests performed abroad on a Rudge-Whitworth wheel showed that the wire type is much stronger than the wooden, both for side strain and direct load. Wire wheels will save tires, but to what extent depends upon the kind and type of wheel used, but tests abroad show them to save about 70 per cent.

FRICTION DRIVE HAS MANY SPEEDS

Disk Will Last as Long as the Car—10,000 Miles Not Uncommon

Berwick, N. Dak.—Editor Motor Age—Is it possible to run electric lights off of a Splitdorf magneto? Would like to connect the side lights of my Paige car with the magneto providing it will run them.

2—What is the address of the people that manufacture the Mayer carbureter?

3—How far will the friction drive of the Metz car run before a person has to get a new disk?

4—How many speeds can be obtained with the friction drive?

5—Did the Hubmobiles have any accidents or breakdowns in the Twin City-Glacier park run?—R. W. Arnold.

1—It will not run them satisfactorily and supply ignition at the same time.

2—Mayer Carbureter Co., Buffalo, N. Y.

3—Motor Age can only state that some have traveled 10,000 miles without replacement.

4—Any number of speeds.

5—The report states that no accidents occurred to the Hupmobile.

SPLITDORF SPARKS ON THE MAKE

Original Construction on Well-Known Magneto—Jay-Eye-See Dimensions

Pettus, Tex.—Editor Motor Age—Why is it that in the Splitdorf magneto a high-tension spark is produced when the breaker points come in contect, whereas in the Remy and Bosch the spark is made when the breaker breaks?

2—What advantage is claimed by the manufacturers of the Keeton car by placing the radiator behind the engine?

3—In what races has the Jay-Eye-See car driven by Disbrow taken part?

4—What is its cylinder bore, stroke, and displacement?

5—What was the name of the car that Disbrow drove on last Memorial day?—John H. Thomas.

1—In Fig. 4 is shown the theoretical Splitdorf circuit, and by following the path of the current from the magneto through to coil it will be plainly seen why the spark occurs when the points make instead of break. It should be remembered in any induction coil the high-tension current is induced in the secondary coil when the current in the primary is broken. Referring to the illustration we note that the current generated in the armature A of the magneto leaves the armature and travels along the low-tension wire. If the points B are separated as shown, then the current from the magneto armature will flow past the point C and through the primary winding of the coil. The points are mechanically made and broken. As soon as the points come together the current will flow through the breaker points and back to the through the ground. But

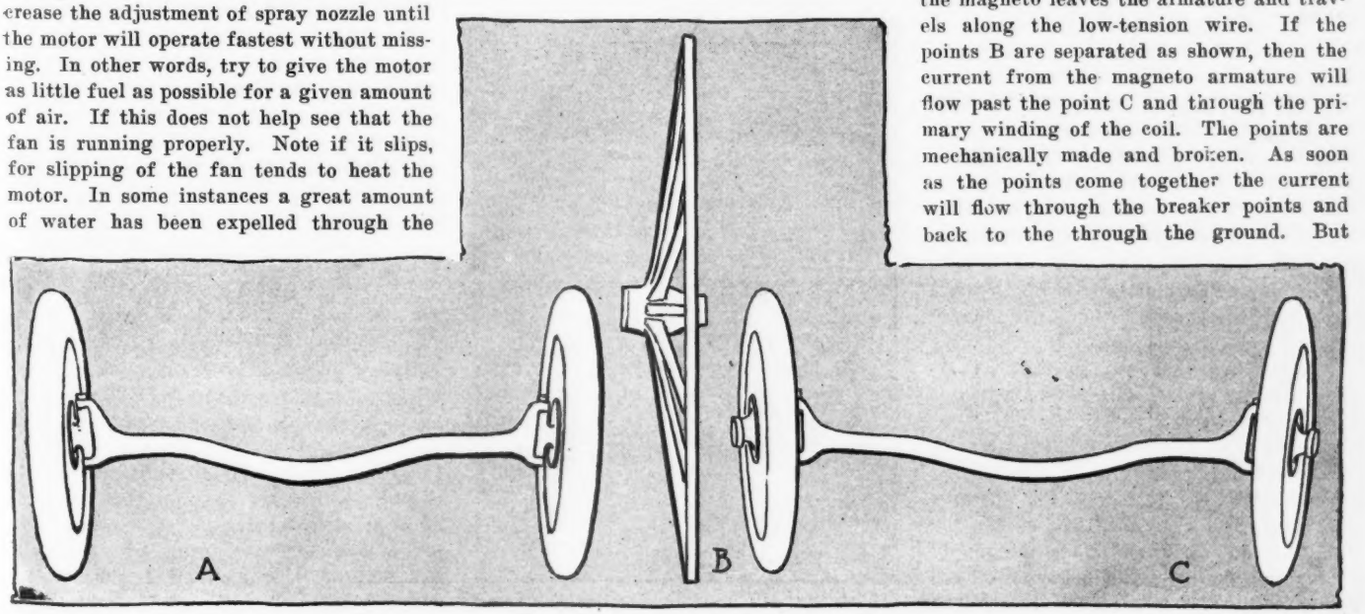


FIG. 2—SHOWING CAMBERED, DISHED AND GATHERED WHEELS

when this happens, that is, when the points come together, the primary circuit is interrupted and hence a high-tension current is induced in the secondary winding of the coil. The condenser does the same work here as in any circuit.

2—By placing the radiator on the dash the appearance of the car is bettered somewhat, also for thermo-syphon cooling the high position of the radiator is to be desired. In the Keeton car it is desirable also, because the blades on the flywheel may force a current of air into the hollow of the radiator and thus an auxiliary cooling system is obtained.

3—In nothing but dirt track races.

4—Bore 9.75, stroke 8.63 inches. The displacement of the Jay-Eye-See is 2,578.43 cubic inches.

5—Disbrow started in a Case car.

REPAIRS FOR BRUSH OBTAINABLE

Power Delivery at the Wheels of the Average Motor Car

San Antonio, Tex.—Editor Motor Age—Kindly tell me where I can get repairs for a Brush runabout?

2—What is Motor Age's opinion of friction transmission?

3—About what percentage of power is delivered from the motor to the road wheels, on a gear-driven car? On a friction-driven car?

4—What is Motor Age's opinion of the two-cycle air-cooled two-cylinder motor for the cyclecar?—H. Holmgreen.

1—Maxwell Motor Co., Newcastle, Ind., or the district sales managers of that company in Memphis, Tenn., Portland, Ore., San Francisco, Cal., or New York.

2—It is not the policy of Motor Age to offer an opinion on this subject.

3—On a gear driven car between 60 and 80 per cent of the power developed is delivered at the rear wheels. It has been claimed that the friction type of transmission is more efficient than the gear.

4—It would be practical for low-speed work, but where high engine speed is required this type would not do.

LUBRICATING SYSTEM ON 1913 COLE

Called Constant Level Splash—Pump Is in the Crankcase

St. Louis, Mo.—Editor Motor Age—Explain by diagram the lubricating system of the 1913 Cole 40 showing also the proper height at which to keep the lubricant.—E. H. K.

The lubricating system employed on the Cole cars is the constant level splash system. In this system the oil is carried in the reservoir in the crankcase, as shown in Fig. 3. The reservoir is located on the left side of the crankcase in the model 40.

The oil pump, which is driven by a worm gear from the camshaft, is of the plunger type and is contained directly within the oil reservoir, as shown, so that on account of the copious lubrication which it receives the wear is practically nil.

The oil pump takes the oil from the reservoir and forces it to a sight feed located on the dash. In this way the operator sees every drop of oil that enters the crankcase and he knows when the supply is running short by the behavior of the sight feed. The oil is sucked into the pump from the bottom on the up stroke

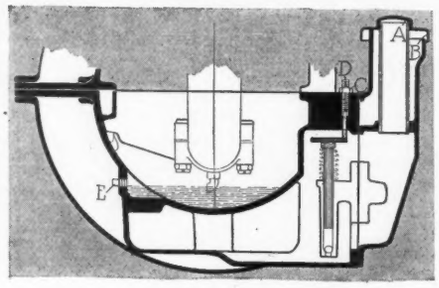


FIG. 3—OILING SYSTEM OF COLE 40

and then on the down stroke is forced up into the lead which takes it to the sight feed. After passing through the sight feed the oil is led to the crankcase where it enters a series of troughs which are located one below each connecting rod. On the bottom of the connecting-rod there is a scoop that catches the oil and throws it up into the cylinders, where it is picked up by the oil wiper rings on the piston and distributed about the cylinder walls.

The troughs into which the connecting rods dip are curved so that there will be no danger of all the oil leaving one of the troughs should the car be ascending a steep hill. Another feature which takes care of the lubrication system on a hill is the sloping troughs on the walls of the crankcase. When the car is on a hill there will be a tendency for the oil in the rear trough to become deeper. This excess oil will be thrown by the connecting-rods against the walls of the crankcase from where it will drain into a series of sloping troughs which lead the oil to the front end of the crankcase. The slopes of these troughs are so great that in spite of the gradient there always will be a gravity flow of the oil back to the forward end of the crankcase. These sloping troughs keep the oil in circulation even on a level road. There is no return of the oil to the reservoir, the pump feeding fresh oil continuously as it is used up by the motor.

In filling, the crankcase the caps A and B

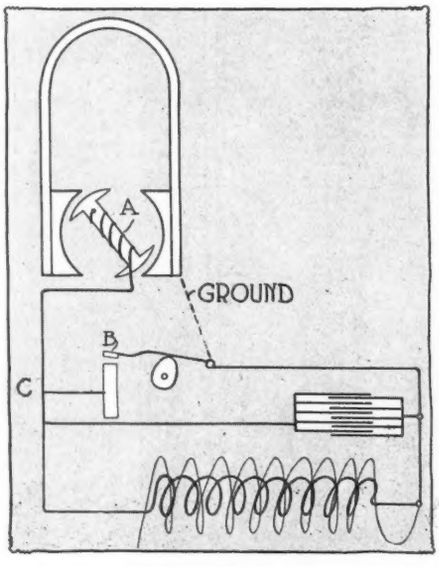


FIG. 4—THEORETICAL SPLITDORF CIRCUIT

are removed and oil poured in until it flows from the level cock E. To pump more oil the screw D is moved downward and for less oil upward. This screw is locked by the nut C.

RADIATOR IS CLOGGED WITH DIRT

Many Compounds Marketed for Cleaning—Acid Injurious.

Ypsilanti, Mich.—Editor Motor Age—I have a Nyberg car fitted with a honeycomb type of radiator. The water does not circulate through the radiator, the engine runs hot and sediment has settled in same. Can Motor Age tell me where I can secure a compound that will cut the sediment out of the radiator. There are boiler compounds for removing scale from steam boilers and there surely must be something that can be used to clean radiators. Will muratic acid injure the radiator?—William Watts.

There are a number of compounds on the market which may be used for cleaning radiators, among them being the following: Skalout, made by G. Walter Gilmer, Jr., Seventh street, Philadelphia, Pa.; Decalcifier, made by the Milwaukee Auto Specialties Co., Chestnut street, Milwaukee, Wis., and Rad-No-Leak, manufactured by the C. R. Supply Co., Elm street, Ottawa, Kan.

Muriatic acid has been used for cleaning radiators, but since it dissolves the metal it would not be wise to use it. A substance which has proven satisfactory in many instances is ordinary washing soda. A strong solution is made with water and the radiator partly filled with it. The solution is then drained and two more applications made, after which the radiator is flushed three times with clean water.

COLE GOES 17 MILES ON A GALLON

Hudson Six Averaged 62.5 Miles Per Hour On the Speedway

Shreveport, La.—Editor Motor Age—What is the weight of the 1913 Cole 40 roadster?

2—How many miles to gallon of gasoline will this car make on fairly good roads?

3—What carbureter does this car use?

4—What is the speed of the 1913 Hudson 6?

5—What is the speed of the 1913 Cadillac?—Will Taylor.

1—The 1913 Cole 40 roadster weighs 3,150 pounds.

2—According to the Chicago agent the car will operate at 12 to 17 miles on one gallon of gasoline.

3—It has a Schebler carbureter.

4—A test performed recently on the Indianapolis speedway showed an average of 62.5 miles per hour.

5—Over 60 miles per hour.

Castor Oil in Racing Engines

Pawhuska, Okla.—Editor Motor Age—Please advise me as to the merits of castor oil for lubricating the cylinders of a gasoline motor.

2—The writer thinks that castor oil was used by Mr. Burman on the Keeton car at Indianapolis races last May.—N. A. Girard.

Castor oil as a lubricant is considered efficient only when used on high-speed engines, such as racing car engines and aeroplane engines. Castor oil is insoluble in gasoline, it is of high viscosity and has a number of other qualities that tend to make it a good lubricant for gasoline engines, but the proper grade of castor oil and that which will not be detrimental to spark plugs and cylinders is expensive. Goux, who won the 500-mile race at Indian-

apolis, used castor oil in the cylinders of his motor and no trouble was experienced with lubrication. It is being used successfully in the majority of aeroplane engines.

2—Bob Burman did not use castor oil in the cylinders of his Keeton car.

WHO OWNS ABANDONED STEAMER?

Car Left Near Aurora, Mo., Nearly 3 Months Ago

Shenandoah, Ia.—Editor Motor Age—On a recent vacation trip to the Ozark country of southwest Missouri we found in the country near Aurora, Mo., an abandoned seven-passenger White Steamer of the large size and evidently of about 1908 model. The farmers there said a bunch of hard-looking men, five or six of them, heavily armed, drove in there with it one evening, left the car and struck out on foot. They would give no information as to who they were or where they came from. The car has been there now nearly 3 months, as this was sometime about June 1.

The car had no license number or other distinguishing marks, but the serial number or car number was 4523. It still stands in the yard of R. S. Drake, Aurora, Mo., and is a great mystery to the farmers of that neighborhood who are in doubt as to what disposition to make of it. They think it is a car which has been stolen and abandoned. I hope this paragraph may reach the eye of the owner of the car and thus clear up the mystery.—Henry Field.

Many Motor Age Readers Are Building Cyclecars

HIGH-WHEELER ON CYCLECAR LINES

This Type Has Not Met With Very Great Success—Has Solid Tires

LITTLE ROCK, ARK.—Editor Motor Age—Can a machine be made similar to the European cyclecar in simplicity of power plant, light weight, etc., but having high wheels with solid tires and standard tread for our American roads? It has occurred to me that if one could get entirely away from the buggy idea—as the cyclecar has from the motor car—and yet use its points of advantage in connection with an unpretentious, light weight power plant and simple, flexible drive like the rubber belt, it would be finer than the cyclecar for touring on our roads.—W. B. K.

Such a vehicle might be built, indeed a number have been built, but have not met with success. You speak of getting entirely away from the buggy idea and still cling to big wheels—demanded on buggies by horse size—and hard tires, a bad thing for any kind of speed work and hard on mechanism. If the designers of cyclecars can forget the buggy, the motor car and the motorcycle, and take up the problem from an engineering standpoint but with the commercial and sales end in view as well, making the car as simple as it is possible so long as it will do the work reliably and well, they will get away from the risk of overdevelopment. This has hindered the progress of the cyclecar abroad very materially.

UNDERSLUNG FRAME FOR COMFORT

Friction Drive Adaptable to Cyclecars—Wheels for This Vehicle

Chicago—Editor Motor Age—I am designing and building a cyclecar, and turn to Motor Age for the following information:

1—Would it be advisable and possible to use an engine, such as are built for canoes? These are light, powerful and can be had in two, four or six cylinders.

2—Could a friction drive on the order of that of the Cartercar be used with this kind of an engine?

3—Would a differential be necessary?

4—Are side car wheels strong enough for a two-passenger cyclecar and what is the price of same?

5—Is an underslung frame better than the other kind and what is the most desirable wheelbase and tread?—F. R. Simpson.

1—The type of motor you mention would do for an experimental machine, but probably would be too heavy and have too little flexibility for cyclecar work. Boat motors are designed for constant load. A motorcycle or cyclecar motor would be better and probably cheaper in the end.

2—Yes. This type of drive is particularly adaptable to the cyclecar with its low horsepower and weight and high speed of motor.

3—No. The belt-drive takes care of this automatically where V belts are used.

4—Wheel hubs suitable can be had for about $2.50 each from the Eclipse company or Harrison & Reed, 1515 Fifteenth street, Chicago.

5—With the 36-inch tread which is used most for American cyclecars the underslung frame will give the advantage of low weight and low seating which is a necessity for comfort and speed in these cars. Using the 36-inch tread seat the riders tandem and run the wheelbase to 80 or 100 inches, depending on the mechanism. This seating gives the best springing and greatest speed.

DISKS OF 12 INCHES DIAMETER

Three Horsepower Motorcycle Motor Good for Cyclecar

Anderson, Ind.—Editor Motor Age—I am building a two-passenger cyclecar with wood chassis, and 9-inch friction disks with a V-belt from jack to rear wheel as final drive. The motor is located well forward under the hood, the disks and jackshaft are under the front seat, center to center from rear axle to jackshaft pulley 30 inches.

I would like Motor Age's opinion about installing a 3-horsepower motorcycle engine in this car. Speed is not what I am after, I will be perfectly satisfied with 20 to 25 miles an hour. I could not safely figure on sufficient power for hill climbing with 3 to 1 reduction between the jackshaft pulley and the rear pulley, and the same reduction in the fristion disk clutch when on low gear. The total weight of this will probably not exceed 300 pounds.—C. H. Lacey.

Make the friction disks at least 12 inches in diameter and 1⅛ V belt; small pulley size in your design, about 6 inches diameter.

The motor will do very well and do better than the speed you mention. No trouble will be had on hills if you allow for sufficient pressure on the disks—about three times the traction effort you want. Your design sounds good if you get the looks at the same time. Use 36-inch tread.

LENGTH AND WIDTH OF CYCLECAR

Eight-Inch Road Clearance—Leather Belt Found to Be Best

Albion, Mich.—Editor Motor Age—I am building a small cyclecar and would like some information.

1—Would the underslung frame be all right with 26-inch wheels?

2—How long and how wide should the frame be using 36-inch tread?

3—Would angle iron 1 by 1¼ inches be too heavy?

4—How much road clearance should there be?

5—What horsepower engine should be used and where could I get same?

6—What kind of belt should be used on cyclecars?

7—What size disk and follower and pulleys should be used?

8—I would like to get all of the Motor Ages up to the present time that have the cyclecar department in, and want to know how much they will cost.—Rollo Benham.

1—Yes, 28-inch wheels would be better, as tires of that size are obtained everywhere.

2—Say 100-inch wheelbase and 24 to 26 inches wide.

3—Wood is better, as it is not affected by vibration.

4—Eight inches is plenty with 36-inch tread.

5—A twin 9-horsepower motorcycle motor will do. Write Spacke Machine Co., Indianapolis, Ind., Wizard Motor Co., Indianapolis, Ind., or Mack Motor Co., Milwaukee, Wis.

6—Use 1⅛-inch V-belt of leather or better still, rubber. The latter will have to be imported.

7—About 12 inches diameter easy. Use front belt pulleys not less than 6 inches in diameter, rear of regular motorcycle size.

8—The cyclecar section appeared in the last six issues of Motor Age, and each copy may be had for 10 cents.

TWO-CYCLE AIR-COOLED IS HEAVY

Would Be Too Large for Use in a Cyclecar—Efficient Speed

Deadwood, S. D., Editor Motor Age—I am building an experimental cyclecar. Are not some commercial trucks equipped with two and three-cylinder, two-cycle, air-cooled engines which work very successfully?

2—Where can I buy such a motor, 10 to 15 horsepower, and what would be its approximate cost?

3—At what speed are these motors most efficient as regards steady running without attention, and high development of power?

4—I have my own cooling device but think two-cycle cylinders might require frequent cleaning.—J. H. Crawford.

1—Yes. They work satisfactorily on the trucks, but would hardly do for use in a cyclecar.

2—We know of none made which would not be too heavy for a cyclecar.

3—This all depends on the design. They can be designed for best efficiency at either low or high-speed points, but not both. The average used is below that of four-cycle motors, however.

4—Hardly more cleaning than is required for four-cycle motors.

The Motor Car Repair Shop

RECENTLY a Thomas was driven over a rock on a country road with the result that one of the oil drain plugs in the crankcase was torn away, leaving a hole about two inches in diameter, as shown at A in Fig. 1. The accident occurred at 3 o'clock in the morning and about 5 miles from the nearest garage. It was necessary for the driver to be in the next town at a stated hour, so he began to devise methods of plugging up the hole so that no oil would leak through, thus causing a bearing to burn later.

The first attempt consisted of pasting about ten tire patches over the hole, in such a way that each patch rested on the one below. In this way the hole was covered completely. Over the patches was placed some cotton waste and over that a piece of wood. The wood was held in place by some wire running around to the motor frame, which is a subframe.

However, the car had proceeded only 2 miles when it was found that the cement patches would not hold in fact they had shifted about 1 inch. Finally it was decided to use another method which proved very satisfactory later. This consisted of cutting up a worn out tire. A piece 5 inches long was used and the bead removed. This piece of tire was placed over the hole in the crankcase and over it and around the subframe were wound many turns of wire. The wire was procured from a fence. It was found, though, that after the wire was drawn as tightly as possible there was still leakage of oil around the edges of the patch. To stop this, wooden wedges were made and these were hammered in place as shown in the illustration. It will be noticed that the ends of the blocks were knicked so that the wire would not slip off. This repair proved to be very satisfactory, and held for about 3 days, when the hole was patched with a piece of metal and welded.

On Motor Adjustments

When a motor is missing or acting queerly how can a repair man tell just where to locate the trouble? The writer has seen instances of the repair man going at the job blindly, without thinking, with the result that the carbureter, magneto and valves were all out of adjustment, whereas the initial trouble was but an air leak.

Some definite system should be followed in determining what ails a motor and if the same system is followed out in all cases it will be found that the job of getting the motor in good shape will be a short one.

This does not mean that if the exact cause is known every other part of the motor should be handled, but it does mean that when there is uncertainty as to what

Broken Crankcase Repair

is causing the motor to misbehave, some system should be followed.

Let us take a motor of four cylinders with but three or perhaps two firing. The average owner will jump to his carbureter without thinking. This is wrong. The first thing to do is to find out which cylinders are missing fire. To do this the head of a hammer should be so placed that part of the metal touches the end of the spark plug and part touched the cylinder. The motor will show no difference in irregularity if a faulty cylinder is found. After determining which cylinders are missing fire, the next step is to find out why they misfire. Ignition is the first thing to look for. Remove the wire from a spark plug and hold the wire about $\frac{1}{16}$ inch from the cylinder while the motor is running. If a spark occurs it means that the defect is in the plug. This should be done with all four cylinders. If no spark occurs, it is evident that the trouble is in the wire, or the distributor or other part of the magneto. After trying all four cylinders and it is found that the trouble is in the plugs, the latter should be removed and cleaned thoroughly and the points spread or brought together so that the gap is about $\frac{1}{32}$ to $\frac{1}{16}$ inch. If in the start the trouble is with the magneto, the first step is to remove the distributor board and clean it thoroughly. See that all the wires are free from insulation breaks. See that the wires make perfect contact at both ends, and that other wires leading from the magneto are tightly fastened. The breaker points should be the last thing to examine. Place a few drops of kerosene on the breaker points.

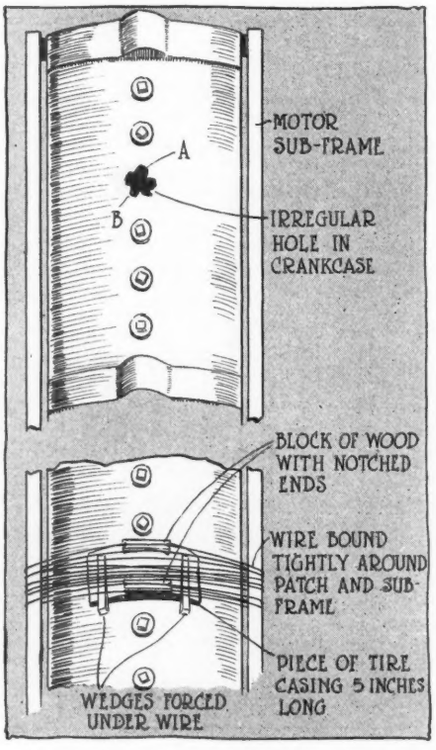


FIG. 1—HOW A BROKEN CRANKCASE WAS REPAIRED

If it has been found that ignition is not the cause, look for air leaks at all plugs and connections. If none is found press the auxiliary air valve open slightly. If the motor speeds up and fires on all four, it means the mixture was too rich previously. Give the motor more air. If, however, the motor stops when the air valve is opened it may mean it was getting too much or just enough air before. Then try the gasoline nozzle. The supply of fuel to the carbureter should be cut down a little at a time until the motor runs smoothly. If it does not, but instead gets worse when the gasoline supply is decreased, then start over again and give the carbureter more gasoline until it runs properly. The very last thing to do is to look at the valves, to note if the clearance between tappet and valve stem is correct. This is usually .01 to .015 for the intake and .015 to .02 for the exhaust.

Water As a Carbon Remover

W. O. Dixon, of the Standard Oil Co., has been experimenting with water as a carbon remover and the results obtained will be of great value to motor car owners as well as garage men.

Mr. Dixon has found that if water is introduced into the cylinders of a motor while the motor is hot and operating at moderately high speeds, the caky carbon deposit is broken up and in a number of tests performed on various makes of cars, the cylinders cleaned entirely of carbon. Although the experimenter introduced the water into the cylinders through a primer he states that this device is not necessary, as the water may be sucked in through the auxiliary air valve of the carbureter.

One-half teacupful of water is permitted to be sucked through the air valve while the motor is hot and operating fast. This operation should be followed immediately by an application of kerosene, either through the primer or through the air intake of the carbureter. This insures the removal of carbon from valve seats and ports. If then the valves are allowed to become seated, and while so, are given a few turns with a screwdriver or pliers, it will be found that compression is good and the motor will run smoothly. This process should be necessary about every 1,000 miles. If the water is used when the motor is not sufficiently hot, it would do no good, as it seems to be the sudden flashing of drops of water into steam that causes the action.

The Motorist's Kindergarten

EDITOR'S NOTE—Motor Age is publishing in this department a series of non-technical explanations of the various parts of motor cars for the benefit of the reader who knows nothing about them. The subjects will be dealt with in the most elementary manner, so that the series when completed will form a simple elucidation of the car.

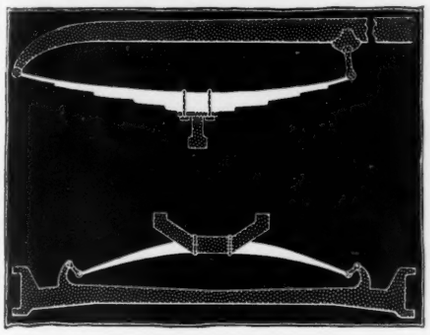


Fig. 78—Upper illustration shows the half-elliptic spring which is in use on the majority of motor cars. The lower picture shows the Ford front spring suspension

MOTOR car springs were taken up only briefly in the last Kindergarten article, but this one will deal with the types of springs, their methods of construction, design and their action, when installed on a car.

The majority of the cars on the market today are equipped with springs of the leaf type. Leaf springs are called so because they are made up of a number of leaves of comparatively thin, flexible metal. These leaves are graded. That is, the top one is long and the next one a little shorter and so on. By referring to the top illustration in Fig. 78 the grading of the leaves will be seen. Sometimes the shortest leaf is on top, as will be seen later.

No Stated Number of Leaves

There may be any number of leaves in a spring, the number depending upon the weight of the car, the riding qualities desired, etc. The fewer the number the more flexible is the spring, but the less the shock-absorbing qualities and ability to withstand great weight. It matters not how many leaves the spring has, the action in all cases is the same, that of flexibly supporting the body and frame of the car. The leaves of a spring have a bolt passing through them at the middle. This bolt holds the leaves together. If the bolt were not used, then the leaves would slip sideways and the spring then fall apart.

The type of spring which is used more than any other is called the semi-elliptic, from the fact that it appears like half an ellipse. This type of spring is illustrated at the top of Fig. 78. The forward end of this spring is attached rigidly to the frame of the motor car, but the rear end or that to the right of the illustration is fastened by what is called a shackle. This permits the lengthening of a spring due to bending, to be taken up.

Types of Modern Springs

To make this more clear. When a motor car is traveling along a road and it suddenly strikes a bump or rut, the body of the car sinks downward. This causes the spring to flatten. This flattening means that the spring becomes longer. If it were fastened rigidly at both ends it would tend to break, so to allow for the flattening of the spring, a flexible joint is placed at one end. This joint is nothing more than a hinge. In some foreign cars the front end of the elliptic spring also is shackled. The deDion is an example of this.

Semi-Elliptic Used Mostly

The semi-elliptic spring is used in the front in most instances. The spring is fastened to the front axle by means of spring clips. These are shown in position in the upper picture in Fig. 78. These clips are nothing more than three-sided bands of steel. These are slipped over the spring and fastened underneath by nuts. The spring clips prevent the spring from moving from the axle and if they were not used the springs would not keep any definite position, but would be skipping all over the axle.

The semi-elliptic is but one form of front spring. The Ford company has adopted a special type for its car, and this spring suspension is shown in the lower illustration in Fig. 78. It will be noticed that there are shackles at both ends of the spring, and that the spring clips are fastened at the center of the spring to the frame. Besides being used for front suspension the semi-elliptic type is used also for the rear.

There are more forms of rear spring suspension to be seen than there are of front suspension. Makers differ greatly as to the merits of the different types and hence

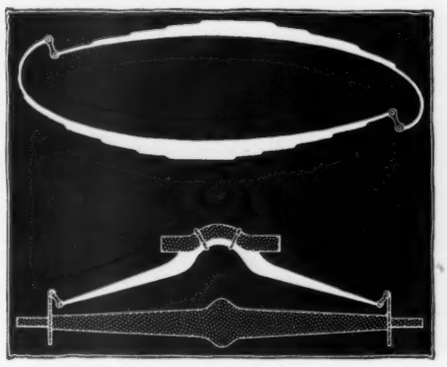


Fig. 80—The elliptic spring is shown at the top and the Ford rear cross-spring at the bottom

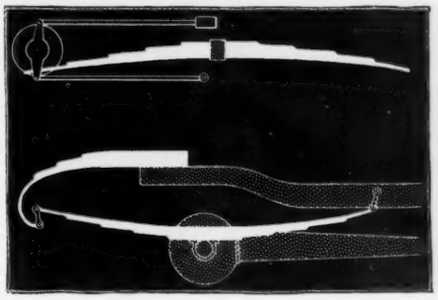


Fig. 79—The cantilever type of rear spring illustrated at the top. The right end is attached to the frame and the left end to the rear axle housing. The three-quarter elliptic rear spring is shown at the bottom

the various styles in use. A common form of rear suspension is the three-quarter elliptic. This is shown in the lower illustration in Fig. 79. This form consists of a semi-elliptic spring with another small piece added. The position of the shackles is clearly shown in the illustration. The small piece on top is fastened to the frame usually by clips or bolts running through the frame and the semi-elliptic portion is fastened by spring clips.

The elliptic spring is one which is said to give easier riding than any other form of rear spring. This type often is referred to as full-elliptic, from the fact that it forms almost an ellipse. It consists of two semi-elliptic springs, one of which is inverted and both parts shackled at their ends, as will be seen from the upper illustration in Fig. 80. This spring is fastened to the axle by clips at the middle of the lower half and to the frame at the middle of the upper half. In the lower illustration in the same figure will be seen the Ford rear spring suspension. This is referred to as the cross-spring. The spring clips are shown holding the spring to the frame and the shackels also are shown at both ends.

The Cantilever Spring

A type of spring which is coming into use more and more abroad and very slowly in this country is that shown in the upper illustration in Fig. 79. It is called the Lancaster or cantilever spring. In this the end to the left is attached to the rear axle housing and the other end to the frame of the car. The middle of the spring is fastened by a trunnion, so that compensation may be made for the flexing of the spring. It is stated that this type does not require shock absorbers. Here the smallest leaf is on top and the largest one at the bottom.

From the Four Winds

Activities Among the Motor Clubs of the United States

THE Centralia Automobile Club has recently posted the road from Centralia to Elma and thence to Olympia, the capital of Washington.

The California State Automobile Association, organized for the purpose of bettering motoring conditions in that state, has decided to increase the monthly dues from 25 cents to 50 cents in order to be better able to care for the motoring public and get more necessary work done.

Fred M. Randall, secretary of the Wolverine Automobile Club, Detroit, has been elected treasurer following the resignation of Leonard Davis, who has removed to New York.

The Ohio Good Roads Federation is sending organizers into every community in the Buckeye state for the purpose of perfecting the organization to boost the cause of good roads. It is planned to make the Ohio organization one of the most perfect in the United States. Local organizations are being formed in every village and hamlet in the state for the purpose of giving encouragement to the market road movement.

A meeting of the executive committee of the Ohio State Automobile Association was held at the Hollenden hotel, Cleveland, August 9, to lay out a plan of action for the coming fall and winter campaign. President Janes of the association reports the membership of the Automobile Club of Jefferson County, the Logan Automobile Club, the Marion Automobile Club and the Delaware Automobile Club. Steps are being taken to organize motor clubs in Toledo, Akron and Canton.

One million four hundred and forty-seven thousand dollars in good roads bonds have been voted within the past 6 months in twelve counties in western North Carolina; the county of Madison having voted $310,000 of this amount for the building of macadam and sand clay roads throughout this wonderful mountain section of that state. On Friday morning, July 25, Governor Locke Craig; Dell M. Potter, president of Southern National Highway Association; H. B. Varner, president of North Carolina Good Roads Association, and chairman of the Board of State Penitentiary, and W. G. Canfield, of Morehead City, left the Langren hotel in Asheville for an inspection trip over the Central highway, which has been designated a part of the Southern National highway extending from Morehead City on the Atlantic Coast to San Diego on the Pacific Coast. With the exception of 6 miles on that part of the Blue Ridge mountains forming the Great Divide, and about 15 miles on either side of the North Carolina and Tennessee state line, this section of the Southern National highway is complete and passable for motor cars.

The Sterling, Rock Falls, Tampico and Princeton Highway association was organized at Princeton, Ill., recently. A good roads parade a mile long was a feature of the meeting. A. C. Stanley, mayor of Rock Falls and an enthusiastic good roads booster, was chosen president of the organization.

NEW Cars in Indiana—During the last 2 weeks in July almost 12,000 motor car licenses were issued by the Indiana secretary of state. The new state law requiring an annual state license became effective July 1, but the tags were not received until 2 weeks later.

After the Delinquents—According to Secretary of State I. M. Howell there are now upwards of 25,000 motor vehicles in the state of Washington. Instead of printing a list of all the owners he will have printed just a list of those who are delinquent, which will be used by the different sheriffs.

Firemen Build Motor Truck—So satisfactory has proved Spokane's first home-made motor truck that the fire department has decided to build two more motor-driven fire fighters. Materials already have been ordered, and some of the best mechanics in the department will start putting together two trucks to replace horse-drawn vehicles. Commissioner D. C. Coates says a big saving can be made by the department in this way.

Motors Insure Fire Protection—Horace B. Clark, president of the Hartford board of fire commissioners, has met with success in the furtherance of the mutual fire protection scheme. Under the plans devised, Hartford, New Haven, Bridgeport, Stamford, Waterbury, Danbury, Putnam and Norwich are centers. By means of motor fire apparatus one town will come to the assistance of another in time of need. This would not be possible if motor driven vehicles were not extensively used. The various towns have agreed to install more vehicles of this type.

Wilmington Ferry Popular—That the improved ferry service established this year between Wilmington, Del., and Penn's Grove, N. J., is popular with motorists, is attested by the fact that last month a total of 839 cars were ferried across as against 220 in July of last year, due to the fact that a large and well appointed ferryboat takes the place of the former boat, the facilities on which were not very good for handling motor cars. The route is particularly popular with Delawareans and southern and western people coming this way who are going to the New Jersey summer resorts, as it eliminates the trouble in getting through Philadelphia and shortens the distance.

Dayton Has Municipal Garage—Dayton is to have a new muncicipal garage for municipal trucks. The garage will be erected on city property along Idylwild avenue. A gasoline tank and pumping accessories will be included in the equipment.

Trouble Over Licenses—A number of motorists in Massachusetts have found themselves in trouble over the fact that they have not complied with the law relative to signing their licenses. When stopped by patrolmen and asked to show their licenses some of them have learned that the law demands that they shall endorse the license with their signatures on the margin provided for that purpose, and failure to do so is a violation of the law. While some officers have let motorists go with a warning, others have summoned drivers into court for neglecting this provision of the law.

Mirror Warns Drivers—The owners of the Hoffman garage at Bedford, Mass., have taken the initiative in a plan to prevent accidents at a dangerous curve on the state highway in that town at what is called the Narrows by placing a big mirror at an angle to the road so that persons approaching the curve from either direction can see the road beyond for a considerable distance. It works well at night as well as by day and the matter has been called to the attention of motor associations in Massachusetts so that other mirrors may be placed elsewhere at dangerous curves.

Uncle Sam Must Register—Motor cars owned by the federal government must be registered and pay the license fee required by the state of Wisconsin, to-wit: $5 per annum per car, under a decision of Attorney-General Owen in response to a request from the acting commissioner of Indian affairs. Indian agents at the various reservations in Wisconsin were recently supplied with cars for official service, and claimed exemption from the Wisconsin motor code. The matter was taken up with the acting commissioner at Washington, who requested an opinion from the Badger attorney-general. Mr. Owen says the cars must be licensed, and this has now been done, the usual rate obtaining.

Starts on Transcontinental Drive—Wagering that he can drive from Los Angeles to New York in 60 days and that at least four of the six Miller tires with which his car is equipped will not blow out on the run from coast to coast, C. H. Smith, a theatrical man of San Francisco, left Los Angeles August 10 on a transcontinental drive.

To Codify Road Laws—Governor Cox of Ohio has named a commission to codify the road laws of the state of Ohio in order to do away with a number of inconsistencies. The codifying commission is to recommend changes in the laws also. The commission consists of William F. Stinch, Cleveland; A. H. Huston, Columbus; J. J. Hudson, Portsmouth; Thomas Mulcahy, Napoleon, and W. A. Hite, Tornville.

Firemen Go Joy-Riding—Charges of conduct unbecoming firemen have been filed with the Indianapolis board of safety by Charles E. Coots, fire chief, against all the members of a motor ladder truck company. The company was sent to repair the truck, which was out of service. After making the repairs, the company decided to drive the truck to Shelbyville, 26 miles away. All would have gone well had not the driver of the truck been arrested for violating the speed law. He entered a plea of guilty and was fined $15 before a justice of the peace at Shelbyville.

Spokane Takes Car Census—While one out of every 166 men, women and children in the city of Spokane, Wash., owned a motor car in 1911, this year one out of every 94 owns a machine, according to the official census of the assessor, whose job depends on not overlooking too many such baubles. In the 2 years the number of cars in Spokane jumped from 663 to 1,272, nearly doubling. This year they were assessed at $525,110, or about $412 each. In Spokane county there are 1,542 machines, as compared with 754 2 years ago, evidencing prosperity on the part of the agricultural population. In 2 years the number of cars in the surrounding territory more than doubled. Many

farmers now take advantage of the ever-increasing mileage of good roads built by state and county to bring their produce to market by motor.

St. Paul Club Tours—Seventy members took part in a 100-mile run of the St. Paul Automobile Club last week. The tour was through Stillwater and Taylors Falls, Minn., New Richmond and Hudson, Wis. New Richmond was the noon control and the new prison at South Stillwater was an emergency control.

Toledo Controlling Pedestrians—The Toledo city council recently passed an ordinance regulating foot traffic. Among the regulations is included that pedestrians must not cut across street corners diagonally and the traffic officers have been kept busy recently trying to enforce this rule, which is expected to help solve the traffic problem.

Same Tax for All—Motor cars are classed with carriages and drays, according to a ruling of the board of equalization in Ascension parish, Louisiana. To make motor-driven cars pay a higher tax than the more generally used class of vehicles was denounced as unfair. An annual fee of $1 is applied to all vehicles as an aid to the road fund.

Every Citizen a Policeman—A campaign against offenders against the motor laws has been adopted in Minneapolis that savors of something new in law enforcement. Every citizen is expected to participate. When a citizen sees a motorist violating the speed law, approaching too near a street car letting off passengers, or hears him open his muffler, he is expected to telephone the number of the car at once to the police department. The superintendent will write a letter to the offender urging support of the law. A second offense will result in receipt of a sterner letter, and the third offense will result in the offender's arrest and prosecution by the city.

Lost and Found Bureau—The Automobile Legal Association of Boston has just devised a plan that already has worked out well. Its officers have asked the members to report to the headquarters at 6 Beacon street, Boston, Mass., when they lose or find any article. During the first week several articles were restored to owners through the new method.

Fords Lead in St. Louis.—The records of the secretary of state at Jefferson City, Mo., show that during the months of May and June 679 licenses were issued to operate cars in St. Louis alone. Of these, 256 were Fords and thirty were Studebakers. Hudson and Hupmobile each had twenty-eight and the Cadillac twenty-three during the 2 months. In May, 138 Fords were licensed and in June 118 were given plates. The remaining 344 cars were almost evenly distributed among ninety-five makes.

Hoosiers Win Again—The Hoosier Motor Club has won the second round of its fight against the city motor license ordinance, Judge Charles Rempster of the circuit court having sustained a decision by Judge James A. Collins of police court that the section of the state license law forbidding municipalities from exacting a municipal license is valid. The city will appeal the case to the Indiana supreme court but has announced no effort will be made to enforce the license ordinance, except as to trucks, pending the appeal. The city has been collecting about $30,000 a year from motor licenses. The test case has Arthur Heiskell, a club member, as defendant.

Another Park Opened—Verdugo park, Los Angeles, has recently raised the ban on motor cars, and tourists who now take the Glendale-La Canada boulevard route may stop in this park.

To Fight Waynes Law—About September 1, the three attorneys named by Charles C. Janes, president of the Ohio State Automobile Association, to test the constitutionality of the Warnes motor law, will meet at Columbus to lay out a plan of action. The new law, which provides for a graduated fee for registration of all motor vehicles, based upon their horsepower, does not become effective until January 1, 1914. Steps will probably be taken to enjoin the enforcement of the law in Columbus and possibly both Cincinnati and Cleveland. It is claimed that the law is unconstitutional because it provides for double taxation.

Ohio After Joy Riders—Ohio's new law in reference to the theft of motor cars has greatly changed matters, it is thought. What has been a misdemeanor, or has been so dealt with by many judges, now is unmistakably a felony. Whereas, it has been easy to let joy riders escape with a small fine, or with nothing more than a brief lecture, no judge who has any regard for law can follow such a course henceforth, it is believed. The penitentiary menaces all persons who ride in motor cars without the permission of their owners. The term of imprisonment may be as much as 5 years. This law puts the stealing of motor vehicles on about the same footing with horse stealing.

Brief Happenings Showing the Enthusiasm of the Good Roads Workers

IN addition to setting aside 2 days this month for the working of roads by citizens throughout Missouri, Governor Elliott W. Major has announced that he would call upon the various county courts of the state to advise road overseers as to the preparations for handling the thousands of volunteer workers he expects to answer his call. The executive said he expected at least 500,000 persons will respond for the work. He aims to get out himself and do some work with a pick and shovel and would like to see every state and county official do the same.

Pacific coast good road workers are deeply interested in the Pacific Highway Association convention, which will be held in Vantion convention, which is being held in Vancouver this week. It will be the purpose of the convention to secure the construction of a first-class trunk road along the Pacific slope as far north and south as possible. Except for two short breaks in British Columbia, this road now stretches continuously from a point a few miles north of Hazelton, in Northern British Columbia, to Yuma, Ariz. However, portions of the northern part of the road are impassable in winter.

By a vote of 129 to 59, the Rock River Valley route was chosen as the official link between Sterling, Ill., and the tri-cities of Davenport, Moline and Rock Island, in the Chicago-Omaha national highway. There were 188 members of the Tri-City Ocean-to-Ocean Highway Association who ballotted and the Mississippi Scenic highway was declared to be in the minority.

Idaho has started work on a 300-mile highway to connect the cities in the northern portion of the state with those in the southern portion. Forty thousand dollars is now available for expenditure on the highway, and the state will shortly purchase $200,000 worth of bonds provided by the legislature.

There is a movement under way to lay out and establish a permanent trail between St. Louis and Burlington, Iowa, to be known at the Burlington way. Among the intermediate cities suggested are Macomb, Beardstown, Jacksonville, Roodhouse and Alton. The distance will be 176 miles.

Jackson county, Oregon, has recently appropriated $500,000 for building roads. The money will be used for building 50 miles of the Pacific highway, which runs through that country.

A new shell road between New Orleans and St. Sophia gives motorists in the southern city the advantage of 33 miles more of splendid speedway.

According to reports received from motorists who have traveled about the state, Connecticut roads in general are much better this year than last. For one thing there is greater mileage of oiled highways. The state highway commission now has piles of fine stone distributed along the main roads. As worn spots appear they are filled in. The commission is praised by the tourists for the method of marking detours. When a road is closed a large yellow sign to that effect is erected and the road fenced off. Direction of the detours is denoted by conspicuous yellow signs bearing the words "State of Connecticut" in black with black arrows pointing the direction to be taken.

Application has been made by W. R. Booth of Everett, Wash., to the Snohomish county superior court to grant an order restraining the county auditor from issuing funds to the road contractors building the Snoqualmie pass highway. He makes the move in order to test the validity of the law prohibiting an expenditure of more than 80 per cent of funds created by tax levy for road and bridge purposes. Under the new law Snohomish county has $63.000 in its fund for this work.

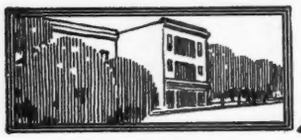
Sangamon county is the first to take advantage of the new state aid highway improvement law among the central Illinois counties. Supervisors are in favor of outlining a system of county roads and favor early action. Under the Tice law it will be a case of first come, first served, for after $1,000,000 appropriated by the recent legislature for the purpose of state aid is exhausted no more money will be available until the next meeting of the lawmakers. Many of the counties of northern Illinois are taking similar action.

Residents of northern Illinois, primarily those in Elgin, Belvidere, Rockford, Freeport and Galena, are beginning to realize the importance of working in harmony to secure state aid for the construction of a permanent highway from Chicago to Galena as a fitting memorial to the memory of General Grant. It is proposed to call this highway the Grant road.

The board of county commissioners in session in New Albany, Ind., on July 16 sold to the Fletcher National Bank, of Indianapolis, $18,400 macadamized road bonds at par. Motorists of southern Indiana are deeply interested because the bonds are issued for the construction of the Green valley road under the provisions of the 3-mile gravel road law. The improvement extends from the intersection of the New Albany and Paoli pike to the New Albany township line at a point near Spickert's knobs.

Officers of the Good Roads Association of Cuba have taken up with President Menocal the necessity of a central highway, the length of the island. It is hoped that the government will appropriate a portion of the money necessary for such a road, which would be a boon to motorists.

A $33,000 road is being built from Clifton, Ariz., to Metcalf, Ariz. The necessary money is being supplied by Greenley county. The construction of this road, which will be of dirt, requires that a great deal of rock be blasted, and most of the money appropriated is being used for this work. It is expected that after the road has been built there will be a demand for motor cars in Clifton and Metcalf.



Among the Makers and Dealers

Recent Incorporations in the Motor Industry

Akron, O.—Anti Rust Co., capital stock, $20,000; to deal in accessories; incorporators, C. T. Grant, F. Rice, L. Dewey, B. Rice, A. Sicherman.

Boonton, N. J.—Estler Garage Co., capital stock, $100,000; general motor car business; incorporators. C. E. Estler, F. Estler, A. Olson.

Chicago—Stewart Auto Accessories Co., capital stock, $1,500; to manufacture and sell accessories; incorporators, F. W. Stewart, L. L. Kennedy, J. A. Steven.

Chicago—Chicago Tire Goods Co., capital stock, $10,000; motor car supplies and accessories; incorporators, L. Dulsky, S. Dulsky, J. E. C. Blake.

Chicago—Electric Auto Sales and Rental Co., capital stock, $12,000; incorporators, N. Rubinkam, H. F. Tucker, G. C. McLaren.

Chicago—Automobile Service Co., capital stock, $30,000; incorporators, H. Decker, S. J. Richman, P. R. Mayor.

Cincinnati, O.—Motor Transportation Co., capital stock, $250,000; to manufacture and deal in motor cars; incorporators, G. Schorr, E. H. Hoelscher, W. G. Hoelscher, H. A. Hoelscher, W. S. Vosler.

Cincinnati, O.—Cincinnati Automobile Clearing House, capital stock, $5,000; to deal in second-hand cars; incorporators, R. Uricho, C. F. Hornberger. A. R. Spangerburg, C. R. Chadwick, S. D. Bromley

El Paso, Tex.—El Paso Rubber Vulcanizing and Auto Suply Co., capital stock, $100,000; incorporators, C. W. Mace, W. Mace, C. Fowser.

Elyria, O.—Weller Motor Co., capital stock, $10,000; incorporators, G. L. Weller and others.

Hammonton, N. J.—Bellevue Garage, capital stock, $10,000; general motor car business; incorporators, E. A. Cordery, P. Cordery, M. Jefferson.

Martinsville, Ind.—Citizens' Automobile Co., capital stock, $25,000; general motor car business; incorporators, W. E. Hendricks, W. A. Kennedy, E. I. Poston, F. C. Ramer, T. A. Hendricks.

Milwaukee, Wis.—Chase Motor Truck Service Co., capital stock, $25,000; incorporators, L. C. Pauly, Jr., E. Paul, L. Fernhaber.

Milwaukee, Wis.—Milwaukee Grinding Wheel Co., capital stock, $65,000; to manufacture disk grinders, etc.; incorporators, R. M. Paul, O. W. Bow, G. W. Buchen.

Mount Vernon, N. Y.—Mount Vernon Auto Station, capital stock, $3,000; incorporators, W. Bunn, LeRoy A. Preston, L. Preston.

New York—Tyres Service, capital stock, $10,000; motor car accessories; incorporators, J. C. Travis, C. L. Clune, M. M. Hovey.

New York—Walzer Corp., capital stock, $10,000; motor car business; incorporators, C. Pechner, S. Sperling, S. Strauss.

New York—Peerless Non-Puncture Co., capital stock, $600; to manufacture puncture proof preparation; incorporators, M. Uran, Harry Citret, F. Eber.

New York—Packard Transportation and Repairing Co., capital stock, $3,000; repair business; incorporators, J. Santora, A. T. Vacarelli, F. Paul, A. Vacarelli.

New York—Auto Supplies Export Co. of America, capital stock, $5,000; incorporators, F. W. Keegan, L. M. Fay, A. Aprahamian.

New York—James J. Fero, capital stock, $20,000; incorporators, W. S. Foos, G. D. Brown, J. J. Fero.

Oshkosh, Wis.—Oshkosh Pneumatic Hub Co., capital stock, $20,000; to market new type hub for wheels; incorporators, F. E. Zuehlke, F. Doemel, J. Laus, Jr.

Little Rock, Ark.—Kerosene Carburetor Co., capital stock, $12,000; to manufacture carbureters; incorporators, W. G. Addison, W. F. Garnett, W. H. Garnett.

Philadelphia, Pa.—Mecca Automobile Society, capital stock, $50,000; incorporators, G. M. Miller, W. F. Voshell, L. T. Layton.

Pittsburgh, Pa.—Latrobe Automobile Turntable and Jack Co., capital stock, $100,000; incorporators, C. J. Jacobs and others.

Poughkeepsie, N. Y.—Wright Storage Battery Co., capital stock, $100,000; to manufacture batteries; incorporators, R. H. Rapheal, M. F. Wainwright, R. H. Hammond.

Springfield, O.—Gramont Traction Plow Co., capital stock, $600,000; to manufacture plows; incorporators, A. W. Grant, P. A. Montanus, O. Kaser, W. McKinney.

St. Catherines, Ont.—Bissell Motor Co., capital stock, $50,000; incorporators, F. Bissell, R. Sheldon, W. P. Good.

Wilmington, Del.—Edward F. Geber Co., capital stock, $500,000; to manufacture and deal in motor cars.

Wilmington, Del.—Muler Co., capital stock, $100,000; to manufacture motor cars; incorporators, S. E. Roberson, C. J. Jacobs, H. W. Davis.

WAHLBERG Promoted—N. E. Wahlberg has been appointed chief engineer of the Dort Carriage Co. of Flint, Mich.

Macauley Packard Vice-President — Alvan Macauley, general manager of the Packard Motor Car Co., has been made also a vice-president of the company. His title now reads "vice-president and general manager."

Duplex Directors Chosen—At the annual meeting of the Duplex Power Car Co. of Charlotte, Mich., the following directors were chosen: Frank P. Town, M. J. Lamson, Maurice Bolstrom, George A. Williams, Frank L. King. Horton H. Bryan and Truman Gillette. Mr. Town and Mr. Lamson were elected president and secretary, respectively.

May Locate at Eau Claire—A motor tractor company, capitalized at $100,000, is negotiating with the Business Men's Association of Eau Claire, Wis., for a location of a plant. The company asks a local investment of about $50,000. Its products are being manufactured under contract with several machine shops and foundries in the middle west at this time.

Packards End Testing Trip—Three Packard experimental cars have completed a testing trip from Detroit to San Francisco. The engineers in charge followed the trail of the forty-niners across the plains, and turned south in Utah, going through Salt Lake City and around the lower end of the Great Salt Lake. This is the route that was followed by H. B. Joy, president of the Packard company, in a recent preliminary survey for the Lincoln highway. R. M. Hidey, superintendent of the Packard experimental shops, left Detroit with one of the cars on the evening of July 15. Two days later J. G. Vincent, chief engineer, started in pursuit and he in turn was followed in 24 hours by William R. McCulla, assistant research engineer.

Howe Company Reorganized—A reorganization of the Howe Engine Co., under the same name, has taken place in Indianapolis and the new company has been incorporated with an authorized capitalization of $50,000. The company manufacture motor fire apparatus. Those interested in the new company are Benjamin J. C. Howe, Lewis M. Howe, H. R. Howe, Perley G. Howe and Murat W. Hopkins. The old company was conducted as a partnership.

Marmon Company 62 Years Old—The Nordyke & Marmon Co. was 62 years old on August 1, but there was no special celebration to mark the event. A small folder was issued, however, commemorating the anniversary and in this was related in an interesting manner the history of the foundation and growth of the company. The company began business in a small way at Richmond in 1851 and has been manufacturing gasoline motor cars since 1901.

Dealers Boycott Iowa Show—The Des Moines Automobile Dealers' Association has declared a boycott on the show to be held in connection with the Iowa state fair, the last week in August. Refusal of the fair officials to sell the dealers space at the same rate granted other exhibitors is the cause of the boycott. Formal action deciding to keep out of the fair grounds show was taken by the association last week. Members of the association declare that the fair management has taken unfair stand by holding that the motor car show is a concession rather than an exhibition. The local dealers have sent a statement of their reasons for the boycott to every dealer in Iowa. Last year the fair show was run under the auspices of the local dealers' association.

O'Rouike Joins Cartercar Forces — J. S. O'Rouike, formerly purchasing agent of the Jackson-Church-Wilcox Co., at Saginaw, has accepted a like position with the Cartercar Co., at Pontiac, Mich.

Indianapolis Branch Dropped—The factory sales office which has been maintained in Indianapolis by the Maxwell Motor Co. has been discontinued and the district will be handled from Cleveland, O. The Indianapolis office was conducted by E. M. Greene, district sales manager.

To Make Muir Hub—Following the return to London of John Muir comes the announcement that the Hayes Wheel Co. of Jackson, Mich., will manufacture the shock-absorbing hub which was introduced by the inventor to the American trade. This hub contains a large number of balls, which distribute the road shocks before they are transmitted to the axle spindle.

Expect $5,000,000 Gross Business—According to prophetic officials, Gray & Davis, Inc., will do a gross business of $5,000,000 during the current year or nineteen times the amount of business handled 5 or 6 years ago. Rapid expansion has made necessary the erection of another large factory in Boston, the company expecting to move from its present quarters at 55 Lansdowne street and occupy the new plant about September 1. The Sprague-Waldo lamp factory at Detroit also has been acquired.

Build Motor Sleeping Car—The Spaulding Mfg. Co., of Grinnell, Ia., manufacturer of the Spaulding 40, has in addition to its regular iine for 1914 a Pullman sleeping car on wheels. The construction is such that a regular appearing touring car body may be transformed into a perfectly appointed sleeping berth in 1 minute's time by the folding back of the back of the front seat which exactly fills the space between the two seat cushions. Among the further appointments of the Spaulding Pullman are a complete set of toilet articles, electric lights in the top tor reading and cigar lighter.

New Orleans' Taxicab Problem—Taxicab companies in New Orleans are in arms against a new ordinance regulating fares and the operation of taxicabs. The principal objection is to the provision making a flat rate between depots and docks and the hotels. The commissioner has refused to make any changes and the question is to be carried to the courts. The taxicab companies are contributing largely to the defense of the hotel stand case, also in the courts. An attempt is being made to prevent exclusive privileges being given for parking space at hotel and theater curbs.

Prosecuting for Short Measure—The first arrest and prosecution under the new Connecticut weights and measures law is that of Frederick S. Sperry of Clinton, who is alleged by the state police to have acquired $20,000 in the past 8 or 9 years by selling gasoline at short measure. The accused was taken before Justice of the Peace Holcomb N. Jones and his case continued under bonds of $300. He is charged on three counts, though it is expected many more will be preferred when the case comes to trial next week. Clinton residents allege that Sperry has been making $28 a day by leaving 90 gallons of gasoline when 100 gallons were ordered and disposing of this shortage to his friends.

One of the beneficiaries of the scheme is said to be a garage in which Sperry in a part owner.

Plan Warehouse in Detroit—The Ohio Seamless Tube Co., of Shelby, O., plans additions and extensions costing $400,000 for the purpose of catering especially to the motor car trade. It is planned to open a stock warehouse in Detroit.

Bump Joins Handley Staff—Following the formation of the J. I. Handley Co., for the purpose of distributing the product of the Marion Motor Car Co. and the American Motors Co., of Indianapolis, President Handley announces that he has associated with him F. R. Bump, formerly assistant general manager of the R. C. H. Corp., who becomes general sales manager.

Case Plant Near Completion—The J. I. Case T. M. Co. is equipping its new south works at Lakeside, Racine, consisting of a foundry and machine shop costing in excess of $1,250,000, and will be ready for operations about August 15. A power plant, 112 by 115 feet in size, is now being built. The drive will be electric throughout. Considerable of the company's motor car work will be done in the new works.

Lozier Contracts Break Records—The contracting of over 1,500 cars in 1 week and from four cities alone constitutes a new record for the Lozier Motor Co., which recently announced the addition of a medium-priced four-cylinder model to its line. The two factories at Detroit and Plattsburg, N. Y., will be placed on a quantity production basis within a short time and the manufacture of the new four-cylinder car will commence early this fall.

Owosso Wants Bonus Back—Mayor John H. Brandel of Owosso, Mich., has made a demand upon the Reliance Motor Truck Co., which recently abandoned its plant in Owosso and removed to Pontiac, for $25,000, originally raised by the city for park purposes, and later, he alleges, paid over to the company in the form of a bonus for the establishment of the plant in Owosso. He alleges the money was illegally paid by the Owosso Improvement Association to the company, and that unless the company complies with the terms of his communication suit will be commenced to recover the amount.

Republic Holds Annual Conference—Branch managers, officials and department heads of the Republic Rubber Co., to the number of two score, were recently the guests of President Thomas L. Robinson at the Country Club, Youngstown, O., at the company's annual conference.

Hupmobiles Lead in Philippines—Of the 1,750 motor cars in the Philippines, about 10 per cent are Hupmobiles, according to Leopold Kahn, general manager of the Levy Hermanos Co., Hupmobile distributor in the islands.

Mailing Leaves Mais Company—Frank W. Mailing has resigned his position with the Mais Motor Truck Co., of Indianapolis, with which he has been connected for the past 2 years as factory superintendent, and has joined the forces of the Stewart Iron Works Co., of Cincinnati, manufacturer of the Stewart truck.

Working at High Speed—Business for 1914 at the Cadillac factory has started with a boom. On July 31 the shipments reached the total of 276 cars for that day alone, the retail selling price amounting to more than a half million of dollars. The shipments of 1914 Cadillacs up to July 31 totaled more than three times as many as the 1913 cars shipped up to August 31 last year.

To Build $150,000 Plant—The Davis Mfg. Co., Milwaukee, Wis., builder of motors for commercial vehicles; farm, ice, road and logging tractors; railway coaches, etc., has purchased a site of 7 acres at West Allis, the manufacturing suburb of Milwaukee, upon which it will immediately begin the erection of a $150,000 motor plant. This will be the third plant erected by the Davis company in 10 years. The new plant will cover the greater part of a solid block bounded by Fifty-seventh avenue, Burnham and Mitchell streets, and the North-Western belt line railway. It will employ 1,600 men, as compared with 650 at present. The main shop will be 250 by 290 feet in size and the administration building, 40 by 100 feet.

Unique Use of Prest-O-Lite—The wide range of possibilities of Prest-O-Lite has been illustrated on different occasions, but the most unique service of this lighting system was performed when Prest-O-Lite was used to light a huge log raft, going by sea from Astoria, Ore., to San Diego, Cal.

Ludwig Joins Velie—F. B. Ludwig has resigned as sales and advertising manager of the Edwards Motor Car Co. of New York and accepted a position as southern district manager for the Velie Motor Vehicle Co., with branch and headquarters at 453 Peachtree street, Atlanta, Ga.

Vote $5,000 Factory Subsidy—The rate payers of Tilbury, Ont., by a vote of 183 to 5 have decided to grant the Canadian Forging Co., backed by Tilbury, Walkerville and Detroit capitalists, a loan of $5,000, as an inducement to it to construct a motor factory at Tilbury.

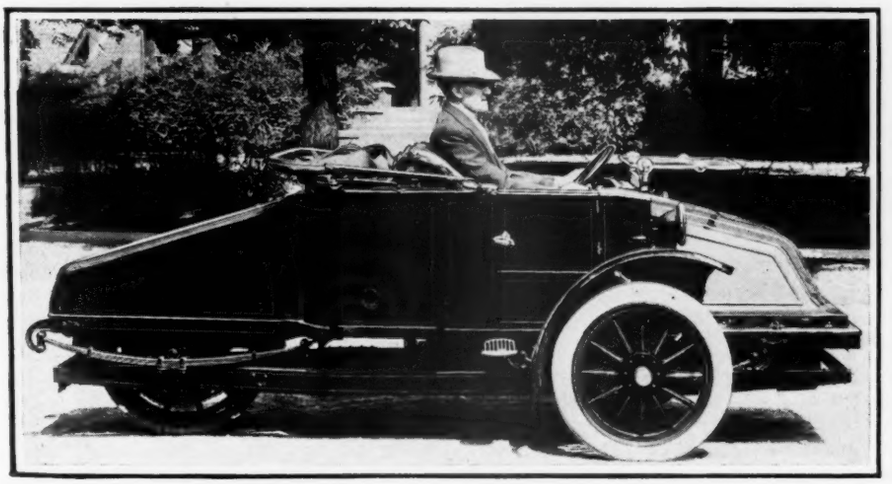
Building Trucks for Army—All officers were re-elected at the annual meeting of the Four-Wheel-Drive Automobile Co., Clintonville, Wis., and reports showed that the company is now at the most prosperous stage in its career. New buildings and extensions are being completed and on August 1 the output was increased to fifteen trucks per month. The concern has some contracts with the United States government for army vehicles and is building a general line of trucks employing four-wheel drive in 1½ and 3-ton sizes.

Hartford Demonstrating Starter—In its marketing of the Hartford electric starting and lighting system the officials of the Hartford Suspension Co. believe in bringing the device directly to the doors of the manufacturer and for this purpose they have built in their own shops a substantial chassis equipped with a Continental motor 5 by 5¾ which has 80 pounds' compression. This chassis is equipped with a Hartford starting and lighting system of a new free clutch design and it is being sent to various parts of the country for demonstrating purposes.

Three-Wheeled Runabout, Made by Wagenhals of Detroit, One of Season's Novelties

W. G. WAGENHALS has built the runabout shown herewith for his own personal use, but it undoubtedly is a prototype of a class of cars that will be put on the market in the near future. It follows the construction of this manufacturer's three-wheel delivery wagons and is in fact built upon one of the standard chassis, with only such changes as were necessary, due to moving the seat from the back to in front of the motor.

The motor is a water-cooled Mason, of 3⅜-inch bore by 3½-inch stroke, and gives the car a wonderfully good acceleration considering the 6 to 1 reduction on high speed. In a ride given the writer the runabout attained a speed of 25 miles per hour in less than a short city block. The gearset is of the planetary type and is controlled by three pedals, for low, reverse and brake, and a hand lever for engaging the high-speed clutch. This is a deviation from the delivery car which is controlled entirely by foot levers, one being double-acting. Very easy riding is given by four semi-elliptic springs, 29 by 3½ inches in front and 34 by 4 inches in the rear. The features of three-wheel drive, radiator position, 60-inch tread and under frame are the same as on the standard truck.



WAGENHALS THREE-WHEEL RUNABOUT

As stated above, this particular car is not intended for the market but may give a hint of what may be developed into a line closely bordering the cyclecar field. The body was made in the truck shops, without any particular attention to its beauty, but the picture shows the effect to be pleasing as those gotten out by English or continental factories which are making a business of building light three-wheel cyclecars. Mr. Wagenhals states that if this type is developed for the market it will be made about two-thirds the size of the present car and will sell for approximately $395. The car now is in operation in Detroit.

With Accessory Makers

Green's Top Lifter

THE Simplex Specialties Co., has been established at Detroit, Mich., for placing upon the market Green's top lifter. The new device is made up of two brass tubes one collapsing into the other, into the ends of which are fastened crooked shaped castings. Sliding over the tubes is a rider, in which is a hole for receiving the iron at the bottom of the front bows, as shown in Fig. 2. The telescoping feature allows the device to be carried in the tool compartment of the car.

When it is desired to raise the top the bow iron is slipped out of the hole in the rear top bracket and one end of the lifter is put into its place and the other end is slipped into the hole in the forward bracket. The bow iron is put into the rider. The operator next goes to the other side of the car, pulls the top up by the strap and carries the front bows on that side to the front bracket and fastens the iron in the usual way. In the meantime the bows on the other side have been moving forward with the slide, as shown in the picture. The front straps are snapped in place, without the usual tugging, before the lifter is taken out. Then the lifter is removed and the bows are fastened in place.

The curved ends of the lifter are so shaped that the rod easily is put on and taken off the car and yet is held firmly in place while it is in use. The complete outfit is nickel-plated. This accessory is light and takes up very little room. It makes a one-man top on any American car, which can be raised as easily as the English pantograph tops that go by that name, it is stated.

Positive Steam Vulcanizer

A portable steam vulcanizer is being manufactured by the Positive Tire Vulcanizer Co., Davenport, Ia., which is capable of vulcanizing casings without removing them from the wheel or deflating them. Fig. 1 shows how the vulcanizer is applied.

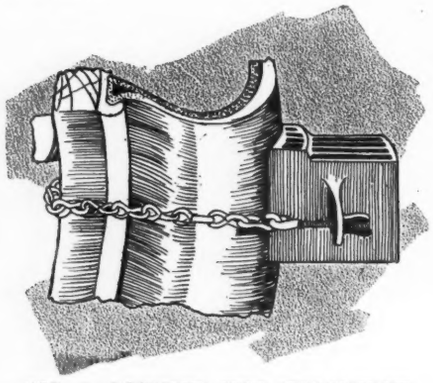


FIG. 1—POSITIVE TIRE VULCANIZER
This instrument does not require the removal or deflation of the tire

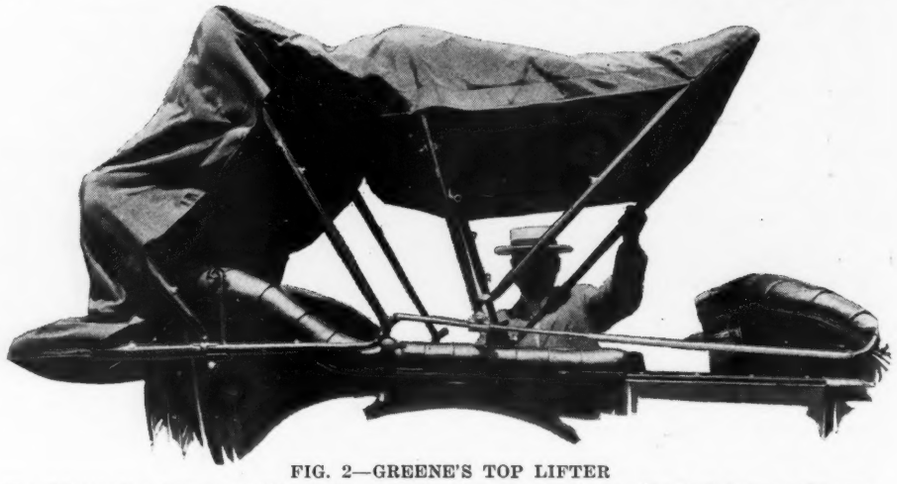


FIG. 2—GREENE'S TOP LIFTER
The telescoping feature of this device permits it to be carried in the tool box of the car

The feature is that after the necessary liquids are inserted no further attention is necessary until the vulcanization is complete. There are two compartments, one for water and another for gasoline. A measure is provided which is used to fill compartments. The gasoline is lighted and after twenty minutes' time the job is supposed to be complete. Although gasoline is considered best a number of other fuels may be used, special instruction being given for their application. Inner tubes may be vulcanized, it is claimed, in half the time required for casings. The maker asks $5 for the vulcanizer.

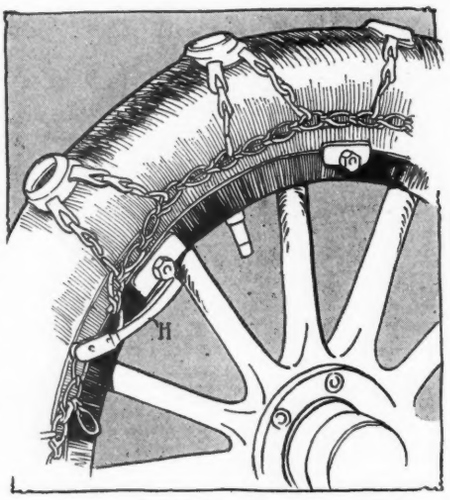


FIG. 3—WALKER VEHICLE CHAINS
The chains are fastened to a tire quickly by the use of the lever H

Walker Vehicle Chains

The Walker Tire Chain Co., Zanesville, O., is offering their anti-skid chains for motor cars with a special device for attaching them. The lever H shown in Fig. 3, illustrating the chains, does the work of fastening the chains to the tire and also holds the chains firmly in place. It will be noticed that the chains consist of rings which are placed in the center of the tread of the tire. These rings are drop forgings, and besides preventing skidding, will not injure the rubber of the tires, according to the statements of the maker. The position of the side links, it is claimed, prevents creeping of the chains. The prices range from $10 for the 30 by 3-inch size to $17.50 for the 40 by 6-inch.

Endura Packing

Gasket material called Endura is being offered by the Endura Mfg Co. Philadelphia, Pa., in a handy form. This packing comes in the form of sheets or rolls. In the former case the dimensions are 41 by 41 inches and the rolls are 41 inches wide and of varying lengths. In either form the packing may be cut into gaskets of any desired size. The maker recommends the packing for use in the water, gasoline and oil connections and not for intense dry heat or for steam joints. Claims are made that Endura packing will not rot, because it is a chemically-treated vegetable fiber with a high degree of toughness. It is said to weigh a great deal less than rubber or asbestos of the same size.

C. M. B. Socket Wrenches

Socket wrenches designed to be used on bolts and nuts placed inaccessibly are being marketed by the C. M. B. Wrench Co., Garwood, N. J. The feature of these wrenches is, that the handle is adjustable in such a way that it may be made to pass over any obstacle. The wrenches leave the factory in boxes containing almost two dozen sockets and the adjustable handle. These sockets are made to fit standard bolts and nuts.

Two New Gould Batteries

The Gould Storage Battery Co., New York, has brought out two new types of batteries, one designed especially for lighting and ignition and the other for com-

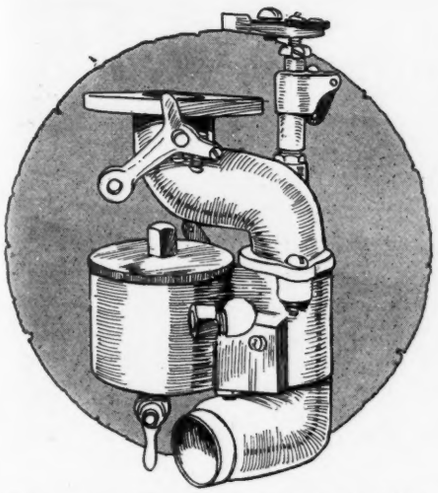


FIG. 4—OUTSIDE VIEW OF THE RAYMOND CARBURETER

This device is said to feed a uniformly saturated mixture of fuel and air

bined lighting, starting and ignition service. The feature of these new accumulators is that the active material of the positive plates is very hard, so that a thin surface layer only is softened when the battery is in service. Long life is claimed for this type of plate because of its resistance to wear and ability to withstand shock due to vibration. The material of the negative plate is said to offset any tendency toward shrinkage, softening of this material being eliminated. Special care has been taken in sealing the jars, so that acid leakage is prevented.

Fishburn Foot Pump Attachment

A device which transforms a hand pump into a power pump for tires has been announced by the Fishburn Specialty Co., Denver, Colo. With it, an ordinary hand pump is attached to the running board of the car and the other end to a spoke of a rear wheel. The wheel is jacked up and as it revolves it forces the piston of the pump back and forth like the side rods of a steam locomotive. The attachment permits of the pump swinging up and down with the movement of the wheel.

The Fishburn device is shown attached to the rear wheel of a car in Fig. 6. Here one of the front tires is to be inflated. In installing this attachment little work is required on the part of the operator, the direction for doing the necessary drilling, etc., being given by the maker. By this method, it is claimed a 34 by 4-inch tire may be inflated to 80 pounds in 2 minutes, if the pump is in good condition. The attachment is sold for $3.75.

Imperator Spring Repairer

The Motor Car Equipment Co., New York, is offering to the motoring public the Imperator emergency spring repairer, which may be used to re-enforce broken springs. The usual place of fracture of a spring is at the center near the spring bolt and it is stated that should the spring repairer, which is in the form of a clamp, be attached at the break, the spring may be used for many weeks without replacement. The useful work of the spring, it is claimed, is not impaired, even if the Imperator is placed at a point between the spring bolt and the end of the spring. Another use to which this device has been

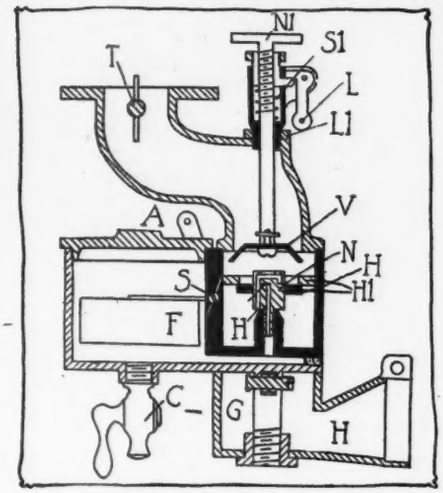


FIG. 5—CROSS-SECTIONAL DIAGRAM OF THE RAYMOND CARBURETER

The two plates H1 permit of the passage of auxiliary air. They are operated by engine suction

put, is in assisting a weak spring. In this event should the repairer be placed at the point of the supposed break, it will hold the spring intact.

Raymond Carbureter

The Raymond Carbureter Co., Des Moines, Ia., are marketing a carbureter which is claimed to have the proper ven-

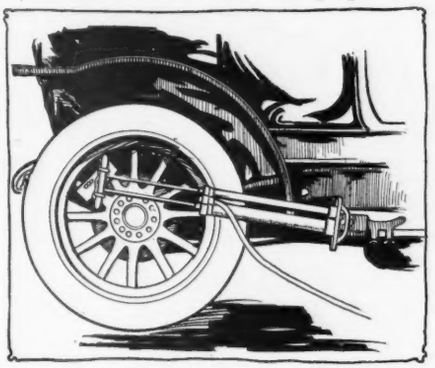


FIG. 6—FISHBURN FOOT PUMP ATTACHMENT

Converts a foot pump into a power pump, the motor doing most of the work

turi for every engine speed, thus producing a mixture uniformly saturated with gasoline. The feature of the carbureter is the gasoline nozzle, which is so designed as to permit gasoline and a small amount of air to pass through at the same time.

The carbureter shown in Figs. 4 and 5 is of the eccentric float type, a metal float F regulating the supply of fuel. A horizontal passage from the float chamber leads below the nozzle N, and the by-pass S supplies gasoline for easy starting, the small butterfly which controls the by-pass being operated through an arm A, movable by hand. The gasoline passing from F to N rises in the latter and after leaving it enters a surrounding chamber, when it passes into the mixture chamber just beneath the valve V. Air enters through H, rises around the gasoline feed pipe G, and through air holes H, enters the nozzle body which it leaves, playing around the fuel outlet and becoming thoroughly mixed with the gasoline. Auxiliary air is supplied through the two plates H1, which are moved by the engine suction and are so linked by a fulcrum that if the upper plate moves up, the lower one is depressed, the ring-shaped aperture between them being thereby deepened. The amount of air passing through the auxiliary port formed by the two plates is, of course, dependent upon the motor suction, and as a rich mixture is needed for starting, provision is made for excluding the auxiliary air port from action entirely at that time. This is done by means of the cover valve V, which is called the strangler valve. The adjusting thumb nut determines the height of this valve over the upper plate, spring S1 serving for maintaining this adjustment, while the lever L, pivoted on the lock nut L1, permits of depressing the stem carrying V until the latter contacts with the upper plate H1. The lever L, can be easily operated by a wire which passes through the radiator and can be drawn down tight, thus closing the auxiliary ports whole starting. In addition, the arm A, may be used for additional priming, if cost weather makes it necessary.

Binks Compound Tire Pump

A tire pump which is designed to be easy to operate is being marketed by F. E. Sparks, Chicago. This pump, illustrated in Fig. 7, is of the compound type. The cylinders are of seamless brass, the large one being of 4-inch bore and 5-inch stroke and the small one of 2¼ inch bore and 5-inch stroke. The plunger rods are of steel. A gauge which will register up to 200 pounds, and 10 feet of hose is offered with the pump, which retails at $15.00. Its net weight is 20 pounds.

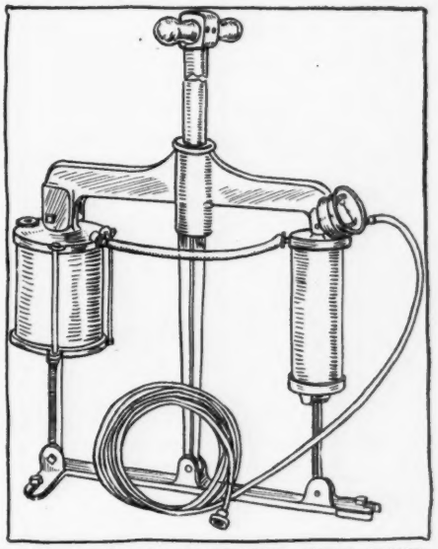


FIG. 7—BINKS COMPOUND TIRE PUMP

Seamless brass cylinders of different bore are used. The gauge registers up to 200 pounds

Brief Business Announcements

Recent Agencies Appointed by Motor Car Manufacturers

PASSENGER CARS

Town	Agent	Make
Alpine, Tex	Young & Edwards	Chandler
Billings, Mont	Walace W. Green	Chandler
Chicago	Stewart Fulmer Auto Co	Wahl
Des Moines, Ia	Van Sickle Auto Co	Read
Des Moines, Ia	Means Auto Co	Premier
Houston, Tex	James C. Clinton	Chandler
El Paso, Tex	Tri-State Motor Car Co	Chandler
Ft. Worth, Tex	Chandler Motor Car Co	Chandler
Fond du Lac, Wis	E. W. Clark Motor Co	Premier
Gloucester, Mass	R. C. Wells	Chandler
Grundy Center, Ia	Hawn & Frost	Chandler
Independence, Ia	Myers, Cowell & Co	Chandler
Kansas City, Mo	White Motors Co	Chandler
Logan, O	Hocking Valley Auto Co	Maxwell
Louisville, Ky	Louisville Lozier Co	Chandler
Marquette, Mich	Asire & Palmer	Chandler
Memphis, Tenn	Chandler Sales Co	Chandler
Minneapolis, Minn	Brice Auto Co	Detroiter
Minneapolis, Minn	Northwestern Auto Co	Chandler
Newark, N. J	Mallon & Earle, Inc	Franklin
Richmond, Va	B. A. Blenner	Chandler
Rockford, Ill	A. L. Hutchins	Chandler
Salt Lake City, Utah	W. H. Tobin	Chandler
Schenectady, N. Y	B. A. Burtis	Chandler
San Antonio, Tex	Lozier Co.	Chandler
Springfield, Mo	Herbert E. Seeley	Franklin
Stockton, Cal	Novelty Garage	Franklin
Tarrytown, N. Y	Koenig Brothers	Chandler
Washington, Pa	C. H. McAllister Co	Chandler
Waverley, Ia	V. A. Birum	Chandler

BRANDON, Man.—J. D. Kennedy has opened a garage at Princess and Twelfth streets, Brandon.

Calgary, Alta.—The Alberta Rubber and Supply Co. has amalgamated with the Motor Supply Co.

Los Angeles, Cal.—R. A. Wood, for 10 years prominent in motor circles in California, is now sales manager for the Big Four Auto Co. of Los Angeles.

Syracuse, N. Y.—Stewart W. Munroe, formerly salesman of Moyer cars, has been appointed Alco representative, with headquarters at Denver, Colo.

Buffalo, N. Y.—J. J. Moriarty, formerly general superintendent of the Goodyear Rubber Co.'s Canadian plant, has become connected with the Frontier Tire and Rubber Co. of Buffalo.

Marietta, O. — Earl Oesterle and George Wilderman, two Marietta mechanics, have opened a repair shop on Juliana street, Parkersburg, W. Va. The repair shop adjoins the Parkersburg Motor Car Co.

Milwaukee, Wis.—C. H. Gray, for some time manager of the Milwaukee branch of the Goodyear Rubber and Tire Co., has resigned and will return to Dallas, Tex., to engage in business for himself. No successor as yet has been appointed.

Kenton, O.—C. E. Nash, who has been operating a motor bus service in Kenton, O., has disposed of the business to the firm of Littleton & Critchfield, managers of a garage on West Columbus street. The business will be operated by the purchasers in the future.

Detroit, Mich.—Ernest Wooler, one of the British engineers who were the guests of the S. A. E. at the 1913 convention in June, was so enamoured with America that he decided to remain in this country and has cast his lot with the Continental Motor Mfg. Co., of Detroit.

Columbus, O.—The Twyman Motor Car Co., of Columbus, distributor for the Studebaker in Ohio and adjoining states for several years, has taken over the retail end of the business in Columbus, formerly handled by the G. E. Thomas Co. The retail department will be conducted at 262-264 North Fourth street with O. W. Lawson as retail sales manager.

Chicago—F. W. Stewart, who has been connected with the local branch of the Buick Motor Co. for a number of years, has branched out in the motor car accessory business. He has the state agency for the Velvet shock absorber, Dann oil cushion spring insert, Auto combination ignition lock and the automatic lamp bracket. These accessories will be handled in Cook county by the Stewart Auto Accessories Co., 1509 Michigan avenue. L. L. Kennedy will be the local manager.

Detroit, Mich.—A. C. Vanderpool has been appointed by the Wahl Motor Co. to act as foreign distributor for its new product.

Rutherford, N. J.—The Braender Rubber and Tire Co. has appointed the following western agencies: The Alfredal Co. of Chicago; Brant Bros. of Indianapolis, and the Keystone Motor Supply Co. of Pittsburgh.

Two Rivers, Wis.—J. Hamacheck & Sons have established a garage and repair shop on Washington avenue. The manager is Julius Hamacheck, Jr., formerly associated with the Mitchell-Lewis Motor Co. at Racine, Wis.

Kenosha, Wis.—The R. J. Murray Mfg. Co., capital $10,000, has been organized at Kenosha, Wis., to conduct a general metal manufacturing and repairing business. Raymond J. Murray is president and general manager and John B. Butcher is secretary and treasurer.

Detroit, Mich.—The W. J. Marshall Auto Co., which disposed of its garage and Paige agency business to the Wetmore-Quinn Co., has opened temporary quarters at 699 Woodward avenue. Upon the completion of its new building, which is being constructed in Detroit's newer motor sales district, this company will take on a new line of popular price cars.

New York—A. C. Platt, who formerly was connected with Wyckoff, Church & Partridge, Inc., has been named manager of the American branch of the Commercial Cars, Ltd., of Luton, Eng., which company has decided to market its United States export trade direct. All the business will be done from New York, where a stock of trucks and a complete store of all spare parts will be kept.

Eau Claire, Wis.—Keeler Bros. & Schur of Hibbing, Minn., have contracted with A. J. Johnson, foundry and machine shop, Eau Claire, Wis., for the manufacture of the new aluminum wheel invented by the Hibbing men. The wheel works on the piston theory and when applied to motor cars and trucks avoids the necessity of using pneumatic tires. The wheel itself is a pneumatic device.

San Francisco, Cal.—C. A. Hawkins, who has been manager of the White Co.'s San Francisco branch ever since the Cleveland motor company has been marketing cars on the Pacific coast, has tendered his resignation to the home office. Mr. Hawkins has large business interests on the coast, and decided to resign because he felt that he could not do justice to the White Co.'s business and at the same time look after his own. He will be succeeded by George A. Urquhart, who is at present manager of the White Motor Car Co. of Dallas.

Chatham, Ont.—A new garage has just been opened in Chatham by Clifford Nagle on Wellington street.

Columbus, Ind.—D. Ogden, a local garage proprietor, is planning to open a tire store in Louisville, Ky., as soon as a suitable location can be secured.

Racine, Wis.—The Harvey Spring Co., Racine, Wis., motor car and vehicle springs, has taken occupancy of its new shop building, 50 by 150 feet, which will enable it to materially increase its production.

Toronto, Ont.—The Dunlop Tire and Rubber Goods Co., Ltd., has concluded arrangements with the Century Rubber Co., of Plainfield, N. J., by which the Dunlop company will control the Canadian rights for the Century fabric-cord tire.

Syracuse, N. Y.—F. C. Benson, formerly president of the James Auto Co., and now with the American Locomotive Co., has been appointed district sales manager for the western territory. His headquarters are for the present in Minneapolis and his territory includes Montana, North Dakota, South Dakota, Nebraska, Minnesota, Iowa and part of Wisconsin.

Savannah, Ga.—C. E. Vinson and George M. Williams have embarked in the motor car business as the Overland Sales Co. It is announced that Frank B. Brooks will be sales manager for the new company. J. A. and Kline Bagwell, who have been handling the Overland in this territory, are going to Houston, Tex. The office of the Overland Sales Co. will be at 713 National Bank building, and the sales rooms at 215 West Oglethorpe avenue.

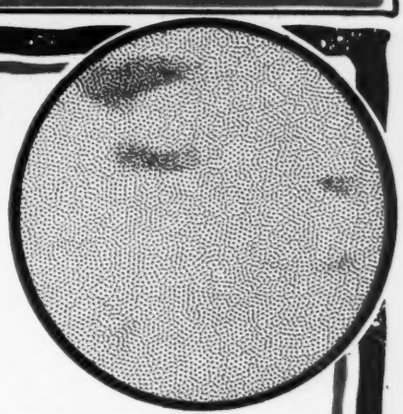
New York—The Bosch Magneto Co. has appointed the following distributors during the month of July: Pennsylvania Rubber and Supply Co., Cleveland, O.; Oxburn Automobile Supply Co., Inc., Memphis, Tenn., and Lamke Electric Co., Milwaukee, Wis. These Bosch supply stations were appointed: W. D. Andrews Co., Syracuse, N. Y.; Diamond Motor Car Co., New Rochelle, N. Y.; George B. Wuestefeld Co., New Haven, Conn.; Newport Engineering Works, Newport, R. I.; Sloan & Clapper, Newburgh, N. Y.; Hamilton & Bertram Motor Supply Co., San Diego, Cal.; J. G. McCrillis & Son; Manchester, N. H.; Automobile Supply Co., Tacoma, Wash.; G. W. Shroyer & Co., Dayton, O.; J. Edward Newton, Fall River, Mass.; Southern Auto & Supply Co., Chattanooga, Tenn.; G. Norman Baughman Co., Inc., Tampa, Fla.; McGraw Brothers Co., Jacksonville, Fla.; Fox-Shryock Auto Co., Fort Wayne, Ind.

ECONOMY

ENLARGED—CROSS SECTION OF AN UNEVEN OR "STREAKED" MIXTURE — VERY UNECONOMICAL

IN THE ACCOMPANYING ILLUSTRATIONS RED REPRESENTS GASOLINE AND BLACK AIR

ANY carburetor not properly designed, feeds a motor just such a "streaked," irregular mixture as that illustrated in the left hand diagram. You will note a patch of gasoline here, a patch of air there. The gasoline is not thoroughly vaporized. It is "raw." In a patchy condition it **can't** explode. Every time the motor turns over these little bunches of gasoline are blown out the exhaust manifold, so much fuel **wasted.** Power is as impossible as Economy.



ENLARGED — CROSS SECTION OF UNIFORM STROMBERG MIXTURE—PERFECT ECONOMY

The diagram on the right illustrates a mixture of perfect uniformity, produced by a STROMBERG Carburetor. There are no gasoline or air patches. The gasoline has completely vaporized, and has been thoroughly "churned" in with the air. Such a mixture burns **clean.** No fuel is wasted. No power is lost.

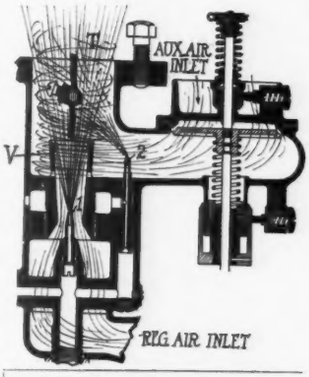
The secret lies in the unique **extended venturi** construction found in all Improved 1914 Model

STROMBERG CARBURETORS

"The Accepted Standard"

The STROMBERG extended venturi (V) reaches as near the throttle opening (T) as possible. Unlike with ordinary carburetors, the velocity of the regular air saturated with gas from the spray nozzle (1) does not slacken in its course through the mixing chamber. No gasoline globules are given time to precipitate on the mixing chamber walls to be drawn in uneconomical bunches to the motor.

The auxiliary air upon entering, by passing over spray nozzle (2), becomes charged with gas. It strikes the walls of the extended venturi at a high rate of speed, and *whirls* around them cyclone-wise (see illustration).



SHOWING HOW THE STROMBERG WHIPS UP A PERFECT ECONOMICAL MIXTURE

On the same principle that the vortex of a cyclone *lifts* the roof of a house, this *whirling* auxiliary air *lifts* or *"boosts"* the regular air. It churns it round and round. Every globule of gasoline is broken up. The firing mixture shot up into the manifold is probably as uniformly perfect as it is possible for anything mechanical to make it.

Every drop of gasoline is *made* to give an account of itself in the motor. That is why we claim *maximum economy* for the 1914 Improved STROMBERG.

You can try a STROMBERG Carburetor on your car free for 30 days—*prove* its economy to your own satisfaction. Write for particulars.

Stromberg Motor Devices Company, 54 E. 25th St., Chicago, Ill.

Branches: NEW YORK BOSTON DETROIT INDIANAPOLIS MINNEAPOLIS

PACIFIC COAST DISTRIBUTORS: Chansler and Lyon Company, Los Angeles, Portland, Fresno, Spokane, San Francisco, Seattle. Canadian Distributors: Russell Motor Car Company, Toronto, Montreal, Hamilton, Winnipeg, Calgary, Vancouver.

Next—

the moderate-priced car

These cars carry the Klaxon as regular equipment:

A. E. C.
Alco
Armleder
Autocar
H. H. Babcock
Benz
Borland Electric
Broc Electric
Buffalo Electric Roadster
Century Electric
Charon (European)
Chicago Electric
Columbia
Croxton
Davis
F. I. A. T.
Hudson (Special)
King
Kissel
Knickerbocker
Knox
Lancia (European)
Locomobile
Lozier
Marmon
Matheson
Maxwell "Six"
Mercedes
Metallurgique
Multiplex
National
Nyberg
Oakland
Oldsmobile
Packard
Peerless
Peugeot
Pierce-Arrow
Pope-Hartford "Six"
Pratt
Rambler
S. & M. "Six"
Schneider (European)
S. G. V.
Simplex
Stafford
Staver
Stearns
Sternberg
Stevens-Duryea
Stoddard-Dayton
Touraine
Walker Electric
Ward
White
Winton

THE moderate-priced car should be Klaxonized.

Disregard the high-standard of Klaxon *quality* and the permanent satisfaction guaranteed to Klaxon users—and consider the question solely on the basis of the advertising value resulting.

The Klaxon, Klaxonet and Klaxet are recognized by buyers everywhere as the *standard* signals—the very best. Car buyers know that they are included as regular equipment of every high-priced car made. They look for them on the car they buy. Finding them creates confidence in the other parts of the car—in the car itself.

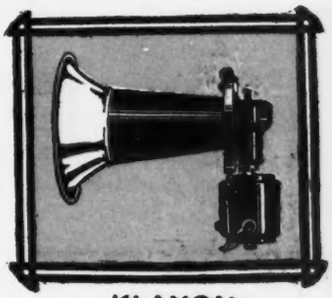
They are accepted without question as the best warning signal equipment possible for a maker to provide. No explanation is necessary—no apology—no argument. The agent is not compelled—as is otherwise frequently the case—to substitute a Klaxon at his own expense for the cheap, unknown signal, in order to make the sale.

KLAXONET

Lovell-McConnell Mfg Company Newark, N.J., U.S.A.

KLAXON

"The Public Safety Signal"



KLAXON

THE ATTERBURY LINE

These Facts Clinch the Sale

Atterbury trucks are today doing the work of commerce in many diversified lines throughout the country—*and they are doing that work efficiently.* Atterbury trucks are powerful servants of industry, speeding along on all roads—and in all climates—performing their tasks with uninterrupted regularity. Every truck which leaves our factory is backed by ten years of specialized truck-manufacturing experience plus the utmost skill of traction experts.

To the user Atterbury trucks offer efficient delivery service. They give exceptionally high mileage at a surprisingly low cost.

In the Atterbury line the dealer has trucks every single feature of which affords a powerful, convincing selling argument. For instance, the working parts are protected by heavy buffer springs on the radius rods which take up all the shock of starting, stopping and operating. The Atterbury trucks have ample power, an automatic governor, multiple disc clutch, indestructible radiator mounted on springs, selective transmission, nickel gears and double expanding brakes on rear wheels.

The Atterbury line of commercial cars comprises 1,500 pound delivery wagons, 1, 1½, 2, 3 and 5 ton trucks, hotel buses, sight-seeing, and pay-as-you-enter cars.

TO THE DEALER WHO LOOKS AHEAD—TO THE DEALER WHO SEES THAT ONE SATISFACTORY SALE MADE NOW, MEANS MORE SALES IN THE FUTURE—TO SUCH A DEALER WE OFFER A SPLENDID AGENCY PROPOSITION.

If You're the Man—Write Today

ATTERBURY MOTOR CAR CO., Black Rock, Dept. "M", Buffalo, N. Y.

Atterbury Model D, 3 Tons

A Continued Story— No. 2

No. 3 Next Week

W-H-A-T--?

You don't have to get out in the mud and slush and soil your clothes—and disposition?

Well, take it from me, you'll have worse troubles than that —and a-plenty of 'em—before you realize the wisdom of your Uncle Dudley.

I've run that wagon a week now, and talk about Starting troubles—why, there ain't any.

I can shake that agent's mitt for putting me wise to the old reliable crank handle.

Write us for full information.

GLBA

Storage Battery

WILLARD STORAGE BATTERY CO., Cleveland, Ohio

New York Branch: 136 W. 52nd St.
Chicago Branch: 2241 Michigan Ave.
Detroit Branch: 1191 Woodward Ave.
San Francisco Branch: 243 Monadnock Bldg.
Indianapolis Branch: 438 and 439 Indiana Pythian Bldg.

Depots in all Principal Cities in the United States and Canada.

TIMKEN

BEARINGS & AXLES

Literally, You Ride on the Bearings

THE actual size of the bearings is small; they are hidden away in the hubs of the wheels; good bearings need scarcely a thought. Yet they support the entire weight of the motor car—whether a light runabout or a heavily loaded truck.

Every roller in a Timken Bearing (average size for pleasure car) revolves 3.59 times during each revolution of the wheel, two thousand and thirteen times each mile of travel.

In 153,618 miles covered by N. W. Curson's car, in and out of Sacramento, each 4/10-inch roller has turned 309,229,008 times. Yet his Timken Bearings are still giving perfect service.

Curson's mileage record is extra long. Few would care to drive that far. Yet you do want to know that the bearings will stand up and give satisfactory service for the life-time of your car. Because cars today are being built for years of work.

Timken Tapered Roller Bearings have many records of long, severe service. In every part of the land motor car enthusiasts will tell you of the satisfaction they give.

Timken Bearings keep transmission, driving shaft, axle shafts, driving and differential gears, working with that smooth, "sweet," quiet uniformity that delights the "motor-wise" owner.

They withstand tremendous shocks, end-thrusts and stresses which would otherwise rack the entire vehicle as it bumps over a stone, drops into a rut, or swings rapidly 'round a corner.

Timken Tapered Roller Bearings do these things not only when they are new, but during the entire life of the car.

Get the whole interesting story of axles and bearings in greater detail by writing for the Timken Primers, T-3 "On the Care and Character of Bearings," and T-4 "On the Anatomy of Automobile Axles." Sent free, postpaid, from either address below.

Do you realize that the axles and their bearings are the most important parts of your motor car?

THE axles and bearings carry the load; are nearest the ground; are the first to meet every shock and stress.

On the front axle depends safe steering; it meets every emergency head on; it is the one part of the car where reliability is absolutely essential to your safety.

The rear axle is the one part of the car that performs more than a single function. It carries the load; it applies power to the wheels; it checks momentum with its brakes; its differential gears allow you to turn a corner safely.

Over 700 Separate Pieces in a Rear Axle!

TO be exact there are 723 pieces in a Timken-Detroit Rear Axle, and each piece, large or small, has an important duty to perform.

Timken experience, dating from the first motor car, proves that all of the 723 pieces are needed to make the most efficient axle.

They are made with such minute exactness that they fit together like the parts of a watch, forming a unit with the strength of a giant, the suppleness and elasticity of an athlete, the smooth, easy, quiet operation of a perfect mechanism.

It needs Timken-Detroit design, equipment, organization and experience to insure this result.

Starting at the Foundation.

TIMKEN starts at the foundation—an expert engineering staff that co-operates with the engineers of the motor car maker. Timken brings to the car builder's problem the specialized knowledge gained only by years of exclusive axle and bearing study and experience.

The Timken Roller Bearing Co.
Canton, Ohio
The Timken-Detroit Axle Co.
Detroit, Mich.

HOLLEY CARBURETOR

Will Pay for Itself in 5,000 Miles

So economical and efficient is the no-moving-parts Holley that it will pay for itself in 5,000 miles.

The new no-moving-parts Holley therefore offers the logical method of cutting down your gasoline bill.

If you have a car equipped with an old-fashioned spring valve carburetor that has been in use for several seasons, take it to your garage man and have him put on a new self-adjusting Holley.

Over half of the gasoline motor cars manufactured in the United States are equipped with the new no-moving-parts self-adjusting Holley carburetor.

1914 demonstration outfits ready. Let us have your specifications early.

HOLLEY BROTHERS CO., 131-141 Rowena St., Detroit

AUTOMOBILE SUPPLY COMPANY..1335 Michigan Boulevard, Chicago, Ill. **OMAHA RUBBER COMPANY**.....Omaha, Neb.
FOREIGN BRANCH: Holley Bros. Co., Coventry, England

Holley Carburetors are carried in stock at the following addresses: **CHAS. E. MILLER, Home Office:** 97-103 Reade St. and 121 Chambers St., **New York**

BRANCHES:

New York City.....924 Eighth Ave. Between 54th and 55th Sts.
New York City.....2782 Broadway Between 107th and 108th Sts.
Springfield, Mass.....Bridge and Dwight Sts.
Hartford, Conn.....274 Trumbull St.
Atlanta, Ga......66 Edgewood Ave.
Brooklyn, N. Y......1421 Bedford Ave.
Buffalo, N. Y......824 Main St.
Albany, N. Y......135 Central Ave.
Boston, Mass......202-204 Columbus Ave.
Detroit, Mich......227-229 Jefferson Ave.
Cleveland, Ohio.....1829 Euclid Ave.
Philadelphia, Pa......318 North Broad St.
New Orleans, La......601-603 Baronne St.
Newark, N. J......274 Halsey St.

When Writing to Advertisers, Please Mention Motor Age.

The J. I. Handley Co.

Announce This Brand New

Better Manufacturing

¶ The J. I. Handley Company is a new corporation headed by J. I. Handley, President of both the American Motors Company and the Marion Motor Car Company. It has been formed for the express purpose of relieving the above mentioned factories of *everything pertaining to advertising, sales and service.*

Thus the American Motors Company will confine its efforts *exclusively* and *solely* to the building of the already famous American Underslung, and will by this plan of specific concentration build them even better than heretofore.

The Marion Motor Car Company will devote its every ounce of energy and thought to the production of the sturdy Marion Four and Sixes, and will thus be able, through this plan of definite departmentization, to give the Marion owner even *greater value* than ever before.

This *does not* in any degree change the individuality of either product.

It *does not* change the financial or production program of either company.

But it does give each factory the full and natural advantages that always come through definite concentration.

Marion

Sole Selling Agents

plan of specific concentration

Better Service

¶ This newest and most advanced plan of specific concentration enables this new selling company to "get closer" to and render *a higher character of service* to both dealer and owner.

All departments are in charge of the highest type and most efficient and experienced men available in the industry.

This plan *does not* in any way affect the dealer's individual connection.

The American dealer's relationship to the American Underslung remains *exactly* as heretofore.

The Marion dealer's relationship to the Marion Company remains *exactly* as heretofore.

But it *does* give every American and Marion dealer and individual owner the advantages of *better service* which result from specific concentration.

Our dealers' sales contract is exceedingly broad and liberal.

We are delivering *the 1914 models NOW*.

We have sixteen division sales managers *now in the field*.

A wire from you will bring one of them to you quickly and his story will be mighty interesting.

Wire us *today*.

The J. I. Handley Company

Affiliated with and sole selling agents for

American Motors Co.
MANUFACTURERS

Indianapolis, Indiana

Marion Motor Car Co.
MANUFACTURERS

AMERICAN UNDERSLUNG

Leading Motor Car Builders As Standard Valve

LESS than a year ago, Rich Tungsten Valves were first placed on the market.

Within six months, over a million had been sold.

Today they have been adopted as standard equipment in such well-known cars as the Pierce-Arrow, Oldsmobile, Cole, Chalmers, Mercer, Garford, Tulsa, Paterson, Jackson, Oakland, Cartercar, Rapid, Mitchell and Sauer.

Condition of Rich Tungsten Valve After 3,411 Miles. Note Glass-Like Surface of Seat.

Such leading engine builders as the Northway Motor Co., Wisconsin Motor Co., Herschell-Spillman Co., Dusenburg Motor Co., International Motor Co. and Aurora Automatic Machinery Co. (Thor Motors), have also adopted Rich Tungsten Valves as standard valve equipment.

In not one instance were our valves adopted without first having been subjected to the most severe test the manufacturer could wish.

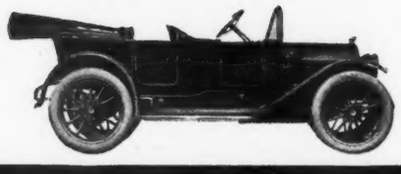
One builder, the Northway Motor Co., found Rich Tungsten Valves stood this test so well that today they spend over $150,000.00 more per year for our valves than was paid for the valves formerly used.

At Indianapolis, fifteen of the cars that entered the race were equipped with Rich Tungsten Valves. Many of these finished the entire 500-mile grind. In every case the valves had given absolutely no trouble whatever and at the end of the race were found to be in perfect condition.

Oakland

Chalmers

Paterson



Adopt Rich Tungsten Valves Equipment for 1914

Rich Tungsten Valves Never Need Regrinding

They absolutely do away with imperfect seating of valves with its attendant poor compression, waste of fuel, accumulation of carbon and impaired efficiency of sparking device, back-firing through intake into manifold, with frequent interference and damage to carburetor. The user of Rich Tungsten Valves can simply forget that his engine has valves.

Condition of Valve Made of Cast Iron Used Less Than 200 Miles. Note the Pitting.

Will Not Pitt, Warp or Leak

Rich Tungsten Valves are absolutely unaffected by heat up to 1700°, and are made in one piece of a dense, tough tungsten alloy steel — the toughest and best heat-resisting metal known. The metal in the stem has the same heat-resisting qualities as that in the head, absolutely preventing warping, burning or breaking off of stems.

Save 20% to 30% on Fuel Bills

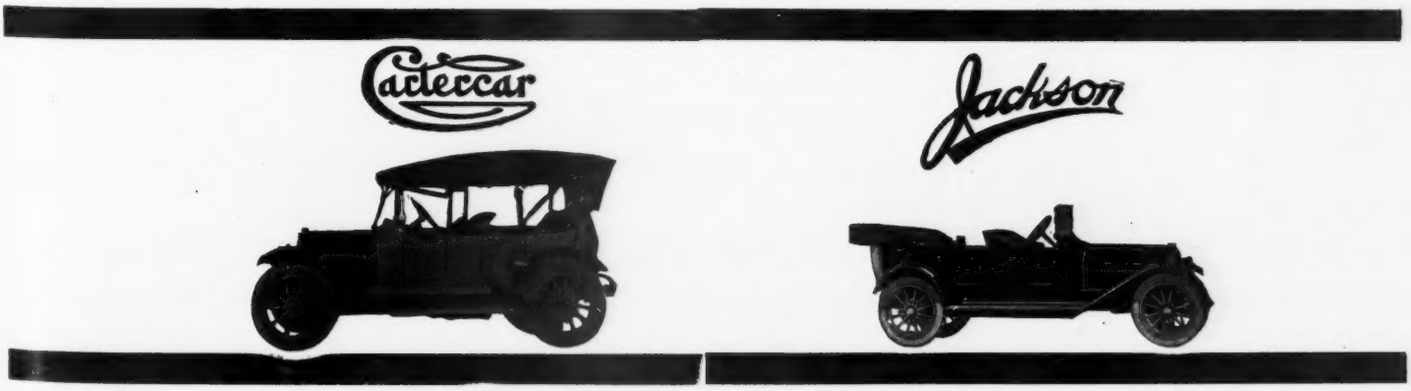
The perfect seating of Rich Tungsten Valves and the absolute freedom from lost compression makes three-quarters of a gallon of fuel do the work of a gallon. At the present prices of gasoline, Rich Tungsten Valves save the user from $50 to $75 a year—many times the cost of a complete set of valves.

Send for Interesting Booklet

Tells valve facts of vast importance to users as well as car builders. Prices on Rich Tungsten Valves of any size and in any quantity gladly furnished on request.

Rich Tool Company

414 Railway Exchange Bldg., Chicago, Ill., U. S. A.

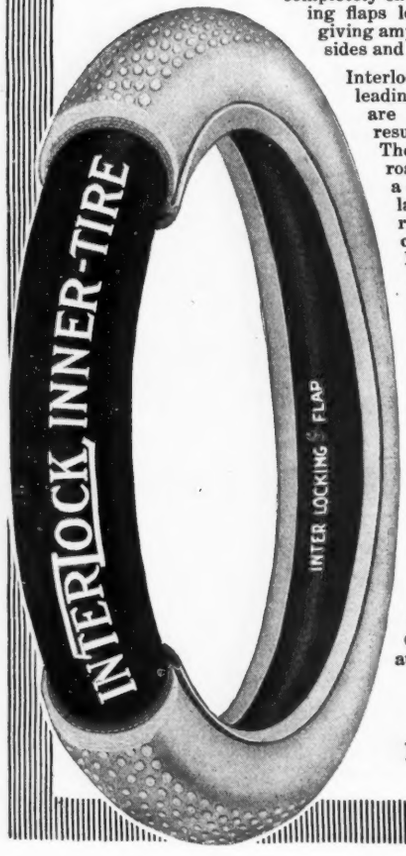


INTERLOCKS

Double Your Tire Mileage

Prevent Punctures and Blow-Outs—Save Half Your Tire Expense

The Interlock Inner Tire is the only reinforcement that prevents rim cutting or that can be used to hold rim cut tires. Interlocks reinforce the sides of the tires as well as the tread, because they completely enclose the tube, and the interlocking flaps lock to the rim under pressure, giving ample excess fabric strength both to sides and tread.



Interlocks are sold and endorsed by the leading automobile supply houses. They are used with the most successful results by thousands of car owners. They have stood the hardest kind of road tests. Interlocks have made a 4,500 mile cross country run—the last 1,000 miles over 20 mountain ranges without a blow-out or even carrying an extra tire. In the Four States Tour, Interlocks stood the test of hard fast road work under the critical observation of tire experts, without tire trouble. These and other hard public tests have proved the efficiency of Interlock Inner Tires beyond question.

What Interlocks Are

Interlock Inner Tires are complete endless inner tires (not inner shoes) quickly and easily placed between the outer casing and the inner tube. They strengthen the outer case and protect the inner tube from punctures. The patented Interlock Flaps lock the Interlock securely, making it an integral part of the whole tire that flexes perfectly, and cannot chafe, creep or heat. Interlock Inner Tires will hold even if the outer case is broken, and can be used in old or new tires. They double the mileage of new tires and add 1,000 to 5,000 extra miles to old ones. Interlocks have a fine gray rubber finish, are smooth outside and inside and have no troublesome ends, joints or edges to cement. Interlocks do not affect the resilience of your tires—are easy to insert and can easily be removed from one tire and replaced in another.

Write for Our Booklet Today

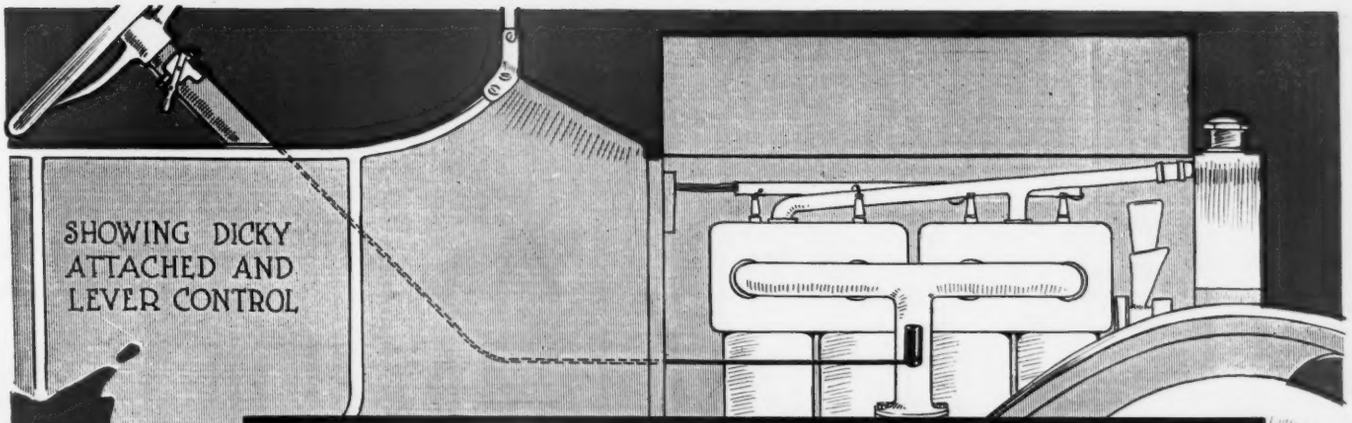
Read the testimonals of enthusiastic users. Let us give you complete information about Interlocks and the official records of hard road tests. Read what the world's largest tire manufacturers say about them. It will pay you to investigate.

To Dealers and Agents We want a live, reliable dealer in every city. You can do a big business by simply explaining Interlocks to car owners. Every car owner wants a set when he understands what they do. We give positive selling assistance and are advertising Interlocks widely.

Interlocks are Carried in All Sizes by:

Beckley-Ralston Co., Chicago; Motor& Machinists Co., Kansas City; Bi-Motor Equipment Co., Boston; Fry & McGill Co., Denver; Western Auto Specialty Co., Iowa City, Ia.; Gibson Automobile Co., Indianapolis; Southern Wesco Supply Co., Birmingham, Alabama, and all leading jobbers of automobile supplies. Please give the name of your supply jobber when you write.

DOUBLE FABRIC TIRE CO.
128 West 9th Streeet - Auburn, Ind.

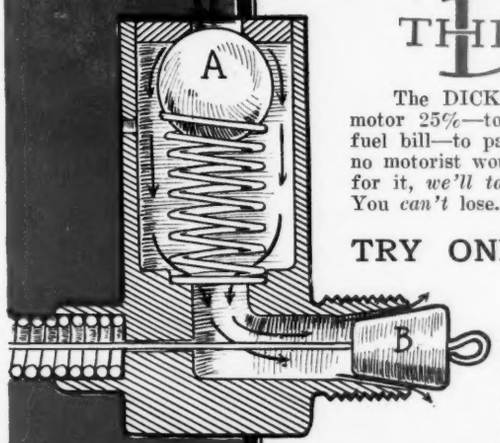


GUARANTEED TO MAKE THREE GALLONS OF GASOLINE DO THE WORK OF FOUR

THE DICKY GAS SAVER

The DICKY is absolutely guaranteed to decrease the fuel consumption of your motor 25%—to increase your power proportionately—to cut ¼ off your monthly fuel bill—to pay for itself many times over in one season. If it *will* do these things no motorist would be without it at 5 times its price—if it doesn't do all we claim for it, *we'll take it back any time* and cheerfully refund its full purchase price. You *can't* lose.

TRY ONE FREE ON YOUR CAR FOR 60 DAYS. WRITE FOR PARTICULARS



SECTIONAL VIEW OF DICKY

The DICKY is not an experiment. For the last 2 years it has been undergoing some of the most rigorous tests — tests in which it *proved* its ability to save in exceptional cases as high as 66% in fuel consumption—to save in gas bills as high as $300 a year—60 times its own cost!

The DICKY is a little mechanical device, absolutely indestructible, without any adjustments, and fool-proof. It is attached to the intake manifold and operated by a lever attached to the steering post.

A is a ball-valve, spring seated; B is a wedge-valve in connection with the steering post control, and located *inside* the manifold.

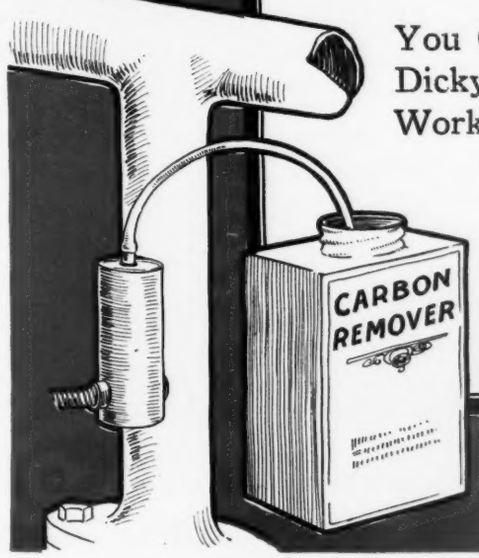
At high motor speeds when the carburetor is unable to supply enough air consistent to a mixture of highest economy and power, wedge-valve B is opened.

Motor suction is now brought to bear on ball-valve A, which opens *automatically*, admitting just enough air to compensate for the shortcomings of the carburetor. You burn air! No unvaporized gas is blown out the exhaust.

Every drop of gasoline is broken up into an *explosive* mixture, *made* to deliver its full quota of power to the drive shaft. To get a rich starting mixture close the wedge-valve.

The DICKY can also be used for decarbonizing your motor by use of a simple rubber tube attachment which is furnished. Anyone can attach a DICKY in one-half hour's time. Remember that we *absolutely guarantee* the DICKY to decrease fuel consumption 25%, or your money refunded.

DEALERS! We want responsible agents in unallotted territory. Immediate action is necessary. Write or wire us.



THE DICKY MAY ALSO BE USED TO DECARBONIZE YOUR MOTOR

You Can Buy a Set of New Tires With What a Dicky Saves You in One Year. Get One Working for you on YOUR Car.

Price, Complete, Nickel plated **$5.00** Postage prepaid

In ordering, use the coupon

Economic Specialties Co.

Manufacturers of DICKY Specialties

1712 Michigan Ave., CHICAGO, ILL.

COUPON

ECONOMIC SPECIALTIES CO., 1712 Michigan Ave., Chicago.

Gentlemen: Enclosed please find (check, money order) for $....., for which please send me prepaid ..... Dicky Gas Saver(s).

Name.....

Address.....

.....

When Writing to Advertisers, Please Mention Motor Age.

Ledger Can Show Hook Up With Cole

luxurious and full of eye appeal, aside from being sturdy and stout and strong? Remember that the woman in the case must like it before the man in the case will put up real money for it. The Cole is Motordom's fashion plate—the standard of beauty and the acme of "guts." It couldn't be otherwise, because actually the world's greatest designers live over the drawing-boards whereon the lines and the construction of the Cole are determined—it is this beauty and beefishness of the Cole which helps you—make more money.

Fifth: Then show Mr. Manufacturer this Roll of Honor, and ask him how many of these standard parts are in *his* car. Then just silently bear in mind that the Cole has *all of them.*

There's no use going any further, now. You either believe in making more money or you are—content. If you believe in—more money you believe in the Standardized Car—the Cole. If you're content, stay with your present proposition—we can't make money for contented men. We want men who fight for supremacy—who stick out their chrome nickel jaws and bore in after business till competition tucks its tail and runs. That's the kind the Cole Sales organization is made of. If you're our kind we can certainly guarantee that you—make more money. Just drop us a line. We need more men—like you.

Incidentally we have doubled our output and are in shape to make immediate deliveries. Nothing is of more importance to you than being able to deliver cars early.

Cole Roll of Honor

PARTS FOUND IN SERIES NINE COLE

Timken Axles and Bearings

Cole Three-Point Suspended Unit Power Plant
(Northway)

Mayo Radiator **Gemmer Steering Gear**

Delco Electric System **Spicer Universal Joints**

Detroit Steel Products Springs

Janney-Steinmetz Seamless Steel Gasoline Tank

Hydraulic Pressed Steel Frames

Firestone Tires **Firestone Demountable Rims**

Warner Speedometer **Stromberg Carburetor**

Taylor Tire Pump—Motor Driven

Collins Curtains

Originators & Builders of the Standardized Car

Right Tires and Right Tire Accessories, All At Right Prices

Indiana Rubber Products

TRACTION TREAD ANTI-SKID TIRES, INDIANA TIRES, or WABASH TIRES, in service and price, will certainly meet with your approval. They are made by tire specialists, pioneers in the business. They are noted for their durability.

INDIANA Inner Sleeves, Inner Tubes, Inner Liners, and Outer Boots set the standard by which all other quality tire accessories are judged. En tour carry an assortment of them with you. They will help to double your mileage. Ask your dealer for them.

Write for Catalog

Indiana Rubber & Insulated Wire Co.
Jonesboro, Ind.

CHICAGO REPRESENTATIVES:
K. FRANKLIN PETERSON
H. V. GREENWOOD
122 South Michigan Boulevard

EASTERN REPRESENTATIVE:
GEO. R. HALL
22 Imlay St., Hartford, Conn.

$950

Overland Model 79

35 horsepower
114-inch wheelbase
Electric head, side, dash and tail lights
Timken bearings
New Splitdorf magneto
Model R Schebler carburetor
Three-quarter floating rear axle
33x4 inch Q. D. tires
Cowl dash
Turkish upholstery
Genuine, hand buffed leather
Clear-vision windshield
Mohair top, curtains and boot
Stewart speedometer
Electric horn
Flush U doors with disappearing hinges

MOTOR—Four cylinders, cast singly and set off center. Bore, 4⅛ inches; stroke, 4½ inches. Five bearing crankshaft; three bearing camshaft. Improved type of pushrods and guides, adjustable and easily removable.

COOLING—Thermo-syphon, or natural water system, without pump. Radiator has large tubes and all water pipes and connections are extra large, insuring perfect cooling.

FRAME—Pressed steel channel section reinforced with angle irons and cross members, hot-riveted.

CLUTCH — Leather-faced cone, with new type brake to permit noiseless gear changing.

TRANSMISSION—Selective, sliding-gear type, with three speeds forward and reverse. Center control. Gear case, extra strong, cast in one piece, keeps all bearings in line. Main and countershafts are short, preventing any springing.

LUBRICATION—Splash system, pump-circulated, with sight-feed on dash.

BRAKES—Double, contracting and expanding on drums on rear-wheel hubs, easily adjustable. Either set of brakes will keep car under perfect control at any speed, with full load.

SPRINGS — Semi-elliptic front, three-quarter elliptic rear, with bronze eye-bushings all around and compression grease cups on all bolts.

STEERING GEAR — Worm and gear type, easily adjustable and anchored to side frame member. Column of large diameter. Wheel, 18 inches in diameter.

FRONT AXLE—I-beam section, drop-forged in one heat, without welding. Timken bearings in front wheel hubs.

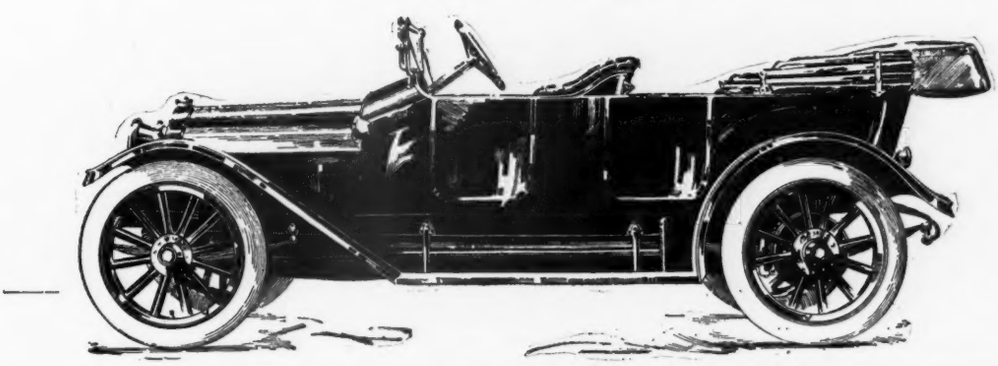
REAR AXLE — Three-quarter floating type. None of the weight of the car on the driving shafts. Hyatt bearings in rear wheel hubs.

WHEELS — Hickory, artillery pattern, with twelve spokes, and bolts in each.

BODY-FINISH—Brewster green, with light green striping. All exposed metal finished in nickel or aluminum.

BODY—Five passenger; metal reinforced with wood framing.

Completely Equipped $950. With Gray & Davis Electric Starter and Generator—$1075 f. o. b. Toledo



Facts &Figures

Of Interest to Everyone Connected With the Automobile Industry

To give an idea of the magnitude of our business, and that we really supply about 75% of the automobile trade in our line, we hereby give the following

SWORN AFFIDAVIT

Helen L. Hicks, of Borough of Brooklyn, City and State of New York, being duly sworn, deposes and says that she has been employed by the Automobile Supply Mfg. Co., a domestic corporation, for over three years last past in the capacity of billing clerk and general office work, and that she is familiar with the shipping slips, shipping books and bill books.

Deponent further states that on July 3rd last she examined said books and same show that the Automobile Supply Mfg. Co. shipped

In Feb., 1913—26,267 Bulb and Electric Horns of different sizes and types.
In Mar., 1913—36,167 Bulb and Electric Horns of different sizes and types.
In April, 1913—34,722 Bulb and Electric Horns of different sizes and types.
In May, 1913—41,215 Bulb and Electric Horns of different sizes and types.
In June, 1913—35,668 Bulb and Electric Horns of different sizes and types.

Sworn to before me this 14th day of July, 1913.

(Signed) HELEN L. HICKS.

(Signed) ISAAC BROWN,
Notary Public, Kings Co.

(The original of the above affidavit is on file in this office.)

The above statement of facts is sworn to. There is no bluff—no exaggeration—no misleading statements. It proves conclusively our claim, that we are the largest manufacturers in our line in the world.

Our sales average over 40,000 horns per month.
Newtone Horns sell on their merit, efficiency and price.

But even with such a production, we have not been able to supply the jobbers with the amount they require. It has been necessary to enlarge our plant; additional floors have been added—more machinery installed and an increased force of skilled mechanics.

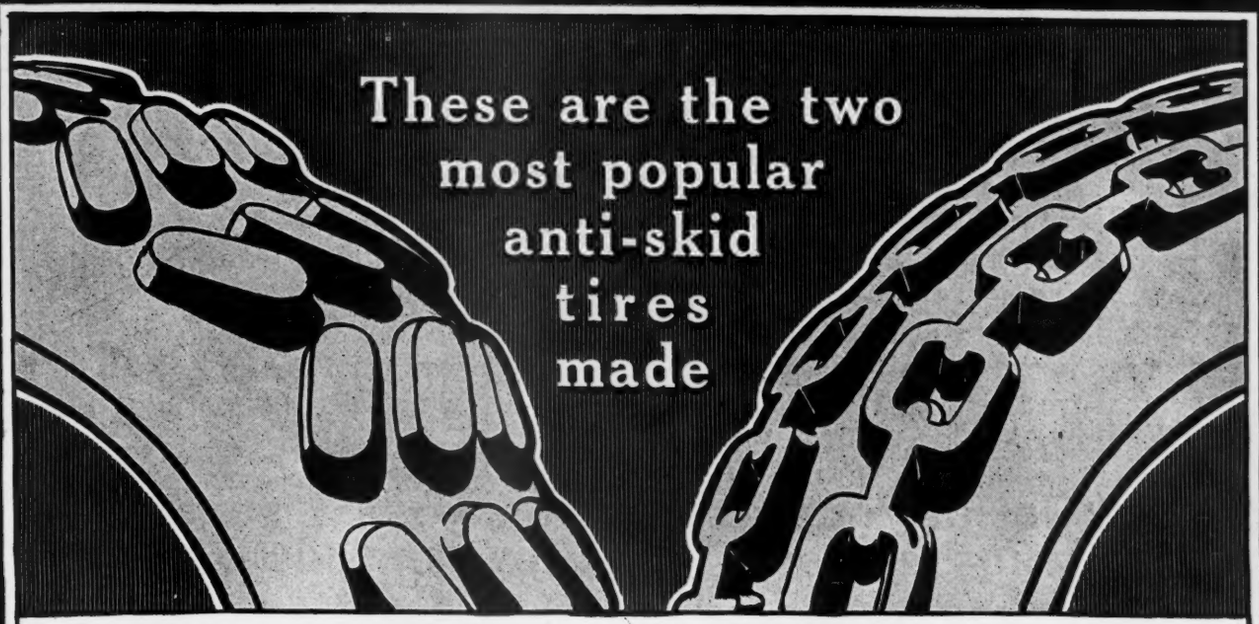
Beside that, we have contracted with **Kendrick & Davis Company,** of Lebanon, for 2,000 motors per week for six months, so that we may catch up with our orders. This, together with our own production, will enable us to take good care of the manufacturers and jobbers as well as foreign orders.

Newtone Horns

Manufactured and Guaranteed by the Largest Auto Horn Manufacturer in the World

Automobile Supply Manufacturing Company

220 Taaffe Place **Brooklyn, N. Y.**



NOBBY TREAD & CHAIN TREAD

The present tremendous demand for these two tires is due solely to the wonderful service they are giving.

Actual records prove that not only are the UNITED STATES "Nobby Tread" and "Chain Tread" the most effective non-skid tires ever manufactured, but that they are yielding more mileage and are giving better all around service than ever was known before in the case of ANY make of tires.

Four-fifths of all the best dealers in the country are reaping the benefits of the universal popularity of the "Nobby Tread" and "Chain Tread." They are the fastest selling tires on the market.

United States Tires

Insist upon them. Sold by reliable dealers everywhere

REAL SERVICE BRANCHES IN THE LEADING CITIES

EASTERN DISTRICT.

ATLANTA, GA.	U. S. Tire Co.	21 Houston St.
BALTIMORE, MD.	U. S. Tire Co.	1100 Cathedral St.
BIRMINGHAM, ALA.	U. S. Tire Co.	423 So. 20th St.
BOSTON, MASS.	U. S. Tire Co.	863 Boylston St.
BUFFALO, N. Y.	U. S. Tire Co.	733 Main St.
CHARLOTTE, N. C.	U. S. Tire Co.	14 So. Church St.
HARTFORD, CONN.	U. S. Tire Co.	Allyn and High Sts.
JACKSONVILLE, FLA.	U. S. Tire Co.	804 Main St.
NEWARK, N. J.	U. S. Tire Co.	276 Halsey St.
NEW YORK, N. Y.	U. S. Tire Co.	Broadway & 58th St.
PHILADELPHIA, PA.	U. S. Tire Co.	329 N. Broad St.
PITTSBURGH, PA.	U. S. Tire Co.	5929 Baum St., E. E.
PROVIDENCE, R. I.	U. S. Tire Co.	18 Snow St.
RICHMOND, VA.	U. S. Tire Co.	709 West Broad St.
ROCHESTER, N. Y.	U. S. Tire Co.	195 East Ave.
SAVANNAH, GA.	U. S. Tire Co.	307 Bull St.
SYRACUSE, N. Y.	U. S. Tire Co.	117 W. Taylor St.
WASHINGTON, D. C.	U. S. Tire Co.	1303 H St.
WORCESTER, MASS.	U. S. Tire Co.	Graphic Arts
WILKESBARRE, PA.	U. S. Tire Co.	60 Main St.

CENTRAL DISTRICT.

CHICAGO, ILL.	U. S. Tire Co.	1222 Michigan Ave.
CINCINNATI, O.	U. S. Tire Co.	1121 Race St.
CLEVELAND, O.	U. S. Tire Co.	1908 Euclid Ave.
COLUMBUS, O.	U. S. Tire Co.	89 N. Third St.
DALLAS, TEX.	U. S. Tire Co.	2022 Commerce St.
DAYTON, O.	U. S. Tire Co.	Second & Jefferson Sts.
DENVER, COLO.	U. S. Tire Co.	215-217 Sixteenth St.
DES MOINES, IOWA.	U. S. Tire Co.	406 W. 9th St.
DETROIT, MICH.	U. S. Tire Co.	245 Jefferson Ave., E.
GRAND RAPIDS, MICH.	U. S. Tire Co.	17 Library St.
HOUSTON, TEX.	U. S. Tire Co.	706 San Jacinto St.
INDIANAPOLIS, IND.	U. S. Tire Co.	527 N. Capitol Ave.
KANSAS CITY, MO.	U. S. Tire Co.	1815 Grand Ave.
LOUISVILLE, KY.	U. S. Tire Co.	904 S. Third St.
MILKAUKEE, WIS.	U. S. Tire Co.	454 Milwaukee St.
MINNEAPOLIS, MINN.	U. S. Tire Co.	1522-1524 Hennepin Ave.
NEW ORLEANS, LA.	U. S. Tire Co.	609 Baronne St.
SAN ANTONIO, TEX.	U. S. Tire Co.	433 Main Ave.
ST. LOUIS, MO.	U. S. Tire Co.	3149 Locust St.
TOLEDO, O.	U. S. Tire Co.	218 Erie St.

WESTERN DISTRICT.

BUTTE, MONT.	U. S. Tire Co.	Park & Idaho Sts.
FRESNO, CAL.	U. S. Tire Co.	Masonic Temple
LOS ANGELES, CAL.	U. S. Tire Co.	923 Grand Ave.
PHOENIX, ARIZ.	U. S. Tire Co.	1st & Van Buren Sts.
PORTLAND, ORE.	U. S. Tire Co.	84 Seventh St.
SALT LAKE CITY, UTAH	U. S. Tire Co.	132 E. Second South
SAN FRANCISCO, CAL.	U. S. Tire Co.	636 Van Ness Ave.
SEATTLE, WASH.	U. S. Tire Co.	814 E. Pike St.

UNITED STATES TIRE COMPANY

Here's Your Chance to Pick a Sure Winner

This is an Electric Gear Shift year. 1914 is not only an **Electric Gear Shift year,** but you, to "make good" for yourself—must sell a car so equipped—just as last year was the electric starter year, and the year before the fore-door year. You know how easily the cars have sold which came out **first** with popular, necessary new features. It is Haynes dealers' turn to again enjoy this money-making kind of a situation this year.

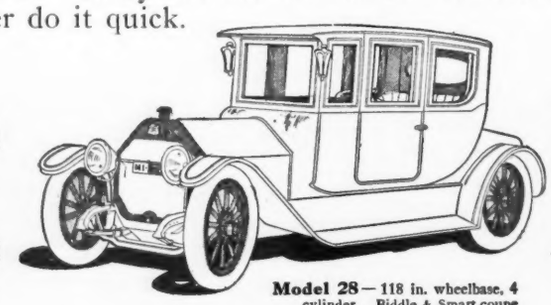
Get in your reservation now if you want some of the new output of

HAYNES

You get absolutely everything that goes to make up a winning sales-maker in the new Haynes Models—good car, good reputation, good factory, good firm to deal with, good men behind the sales and advertising—and in addition to all these things, you get the new feature that everybody's hearing about, talking about and will be wanting to see and have in their car—you get the features that give you the **selling wallop** that will put the sales over with a bang—bring prospects to you begging for one of the cars with the new Vulcan Electric Gear Shift, just as buyers were begging in recent years for the car with fore-doors and electric self-starters, only in an even larger degree.

The increase in the Haynes output again permits opportunity to knock at your door

She may not knock again. Our increased output is rapidly being allotted. A large number of dealers who delay are bound to get left. Quick action is necessary. The telegraph and special delivery letter are being worked overtime by dealers eager to get the Haynes, and not a few have hurried to Kokomo to see us. They are the wise ones. Whatever you're going to do, you had better do it quick.



Model 28—118 in. wheelbase, 4 cylinder. Biddle & Smart coupe body. Price, **$2700**

Even Without the Wonderful Electric Gear Shift, The New Haynes Models Are Winners

They are the sensation of the season. The lines are very pleasing—elongated and sweeping. The equipment includes electric self-starter, electric lights, mechanically operated tire pump. The cowl board equipment includes switch for electric lights, oil sight feed, ignition, automatic cut-out for the lights, dash-light, auxiliary air-pressure pump, air gauge and speedometer. The gasoline supply is pressure-feed. The doors are extra wide—seats and tonneau extra roomy.

Haynes Dealers know and say they have the strongest selling car in the automobile field

Behind all the comforts and conveniences of the new Haynes Models—standard equipped with Vulcan Electric Gear Shift, electric starter and electric lighting—is the well-known Haynes reliability, surety and economy, the result of twenty years perfecting—and back of all that is the pride and the satisfaction of owning a Haynes—America's pioneer gasoline car. If you want some of the new Haynes Cars let us hear from you at once.

Haynes Automobile Company, 2 Main St., Kokomo, Ind.

Specifications of The New Haynes

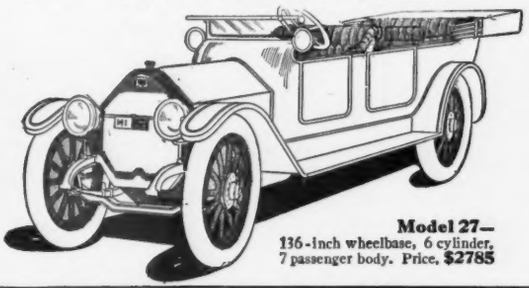
Motor—Bore 4¼ in., Stroke 5½ in. L-head Haynes. Cylinders cast in pairs. Model 26, A. L. A. M., 43.35 H. P., Dynamometer, 65 H. P. Model 27, A. L. A. M., 43.35 H. P., Dynamometer 65 H. P. Model 28, A. L. A. M., 29.9 H. P., Dynamometer 48 H. P.
Cooling—Centrifugal pump and pressed steel fan.
Wheel Base—Model 26, 130. Model 27, 136. Model 28, 118.
Ignition—American Simms Magneto.
Lubrication—Splash and gravity feed.
Control—Left hand. Vulcan Electric Gear Shift.
Transmission—Selective Type, three speeds forward, one reverse.
Steering Column—Worm and worm gear type.
Clutch—Haynes contracting steel band.
Rear Axle—Full Floating Timken on Models 26 and 27; McCue, Model 28, Gourney Bearings.
Front Axle—I-beam. O. H. steel heat treated.
Wheels—Artillery type. Funk demountable rims.
Tires—Models 26 and 27, 36x4½. Model 28, 34x4.
Springs—Front Semi-elliptic 39½x2, rear 48x2.
Brakes—15¼ external and 15 internal Models 26 and 27. 12 and 16 internal on Model 28.
Finish—Indiana dark blue body. Pacific Tour gray, optional.
Gasoline Feed—Pressure. Automatic feed.
Upholstery—Buffed leather—deep cushions.
Starting and Lighting—Leece-Neville electrical system.
Dash Equipment—Electric lights, sight oil feed, automatic cut-out for generator, dash light, auxiliary air pressure pump, air gauge and speedometer. Models 26 and 27 have rim wind clock and shock absorbers.
Other Standard Equipment—Top, top cover of silk mohair, mechanical tire pump, rain vision ventilating windshield, Vulcan electric gear shift, two large electric headlights, electric side lights, electric tail light, full dash equipment, electric starter, generator, 80 ampere hour storage battery, speedometer, horn, coat and foot rails, tire irons, full tool equipment, one extra demountable rim and Collins curtains.

PRICES

Model.
26—130-in. wheelbase, weight 3800 lbs., 2 pass. Roadster, 4 or 5 pass. Touring, **$2700**; Coupe **$3200**
27—136-in. wheelbase, weight 4000 lbs., 6 or 7 passenger Touring - - **$2785**; Limousine **$3850**
28—118-in. wheelbase, weight 3450 lbs., 2 pass. Roadster, 4 or 5 pass. Touring **$1985**; Coupe, **$2700**

Hand lever optional on all models at $200 reduction

HAYNES AMERICA'S FIRST CAR



Model 27—136-inch wheelbase, 6 cylinder, 7 passenger body. Price, **$2785**

HAYNES AMERICA'S FIRST CAR

THE STURDY

STUTZ

MADE GOOD IN A DAY

Stutz value is as consistent as its performance

The foundation of Stutz success has been built on that fundamental principle of successful motor car construction—*sturdiness.*

Its reputation—made in a day—was due to the splendid quality of all its parts and superior mechanical principles.

Although Stutz success is directly traceable to its sound construction, yet its power, simplicity and beauty have been contributing factors.

No important mechanical change has been made in the new Stutz Series "E" Car. Just a few details have been altered which make it sturdier than ever before, insure even greater service and power to its owners.

The Stutz has everything you want in a motor car

The Electric Starting, Lighting and Ignition systems employed in the Stutz are separate units, thus eliminating any chance of complication. The self-starter is so simple that a child can understand it. It works quietly and certainly. Electrical experts regard our installation as the simplest and, therefore, the best on the market.

Stutz Features

A Digest of the Peers

1 Dependable Electric Starter.
2 Lighting System—Remy electric generator with storage battery
3 Cone clutch
4 4¼ x 5½ T-head motor in 4-cylinder models; 4x5 T-head motor in 6-cylinder models
5 Stutz special rear system
6 Timken front axle
7 Gemmer steering gear
8 Force feed oiling system through hollow crank shaft.
9 Tires 34 x 4 1-2.
10 Black and nickel trimmings throughout.

Stutz Cars are made in both four and six-cylinder models.

A glance at the Stutz specifications, some of which are shown at left, will explain the foundation upon which its wonderful record for endurance was built.

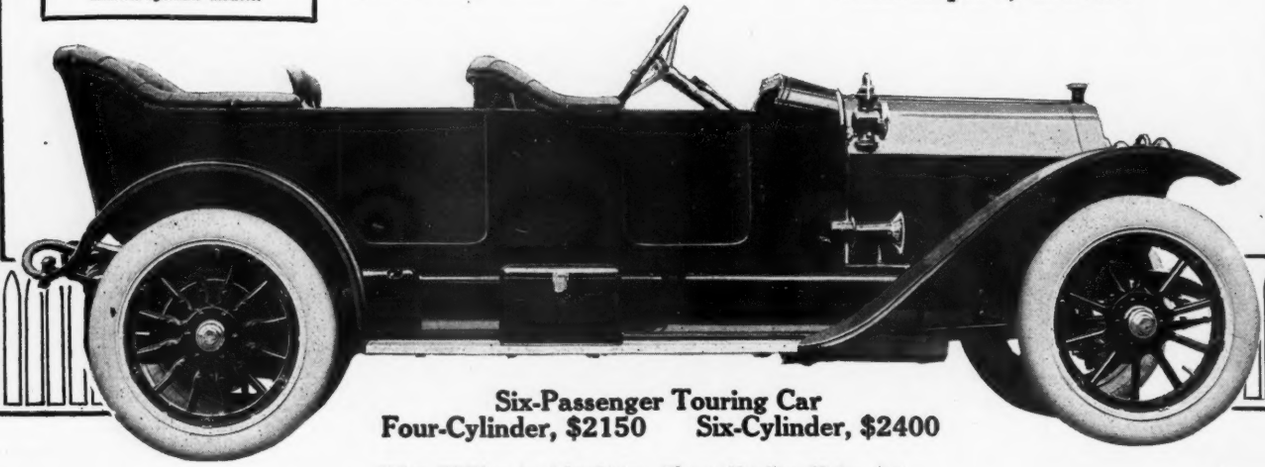
Stutz touring and roadster models in four and six-cylinder cars show some pleasing innovations. Their extreme beauty is matched only by the generosity of dimensions and comfort.

And, finally, Stutz price is fully justified. Stutz cars are manufactured under the watchful eye of Harry C. Stutz, their designer. Stutz cars have had no bad years—the company was immediately successful—its stock is not watered. Stutz value is as consistent as its performance.

We have prepared a simple booklet containing illustrations and detailed specifications of our Series E Models. Compare any car at any price with the Stutz—on paper and on the road—and you'll soon learn where to make a certain investment in motor car satisfaction.

The best car for the individual is the best car for the dealer. We appreciate letters for information from both sources. Write for the new Series E Catalog, No. A-2.

Stutz Motor Car Co.
Indianapolis, Indiana



Six-Passenger Touring Car
Four-Cylinder, $2150 Six-Cylinder, $2400

Bosch Wins

Grand Prize Race of France

The fastest road race of the year, the Free-for-All Grand Prize Race of France, was another "Clean Sweep Victory" for Bosch Magnetos and Plugs.

1st	Bablot	De Lage	-	Bosch Magneto and Plugs
2nd	Guyot	De Lage	-	Bosch Magneto and Plugs
3rd	Pilette	Mercedes	-	Bosch Magneto and Plugs
4th	Salzer	Mercedes	-	Bosch Magneto and Plugs
5th	Duray	De Lage	-	Bosch Magneto and Plugs
6th	Lautenschlager	Mercedes	-	Bosch Magneto and Plugs
7th	Thoms	Schneider	-	Bosch Magneto and Plugs

This showing, made by Bosch, was not an accident, not a mere chance performance but a clean cut, sweeping victory by which it was again proven that Bosch Products give not only reliable and efficient service, but consistent service also.

Don't Court Puzzling Ignition Trouble
Be Satisfied :: :: Specify Bosch

Bosch Plug and Magneto Literature on Request

BOSCH MAGNETO CO., 214 W. 46th St., New York

FULLY EQUIPT STATIONS IN ALL IMPORTANT CENTERS

Where Have Your Profits Gone?

By C. P. HENDERSON

FOR years—almost since the inception of the automobile industry—I've hunted the secret of your profit-*loss*. It's not because you don't sell enough cars It isn't because of the profit per car. It isn't because your establishment is too expensive. But it is because at the very height of the heavy buying season you don't get *cars of the year ahead.*

Your prospects hold off for 1914—those who do buy, buy discount cars—the precious selling weather slips by—winter is on before your 1914 deliveries commence. And then people are *not* buying.

That's where your profits go!

HENDERSON

You Should be Selling 1914 Cars Today

Today you should be offering your market 1914 cars. For the leaders next year will supply carburetors that will burn kerosene or gasoline—thus cutting the year's fuel cost down 75 per cent.

Also wire wheels, cowl dash, cowl gasoline tank, left drive, the new center seat control, dust-proof en bloc motors with oversize cooling and, of course, electric, self-cranking and lighting systems.

But you cannot offer them under any other name than Henderson until the precious selling weather has disappeared *with your profits.*

Popular Models for Every Class of Trade

For we are a year ahead with our car. We anticipated the demand—we came out early with 1914 models. Since May 20th we have been shipping—our dealers get their maximum profits.

And the models, too, are the ideal to sell. There is the Light Four, at $1585—ideal country and city business; the De Luxe Four, for city business and some country trade; the Six for large city trade; the coupe for the large city business.

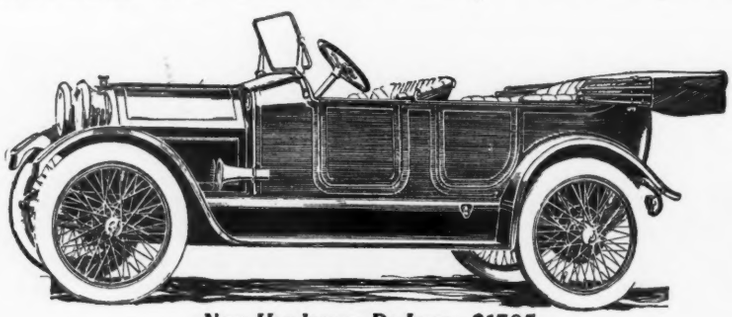
Is not this a wonderfully balanced line? And remember, we supply it at the time *when buying is heaviest!* When biggest profits are possible.

Dealers tell us, because we know their conditions, that we are destined to be leaders in the moderate-priced class.

If what we have said interests you and you are the type of man we like, wire us about territory—or come to the factory if you can. May we hear from you quickly?

The New Henderson Six, Touring and Roadster Models, $2285.

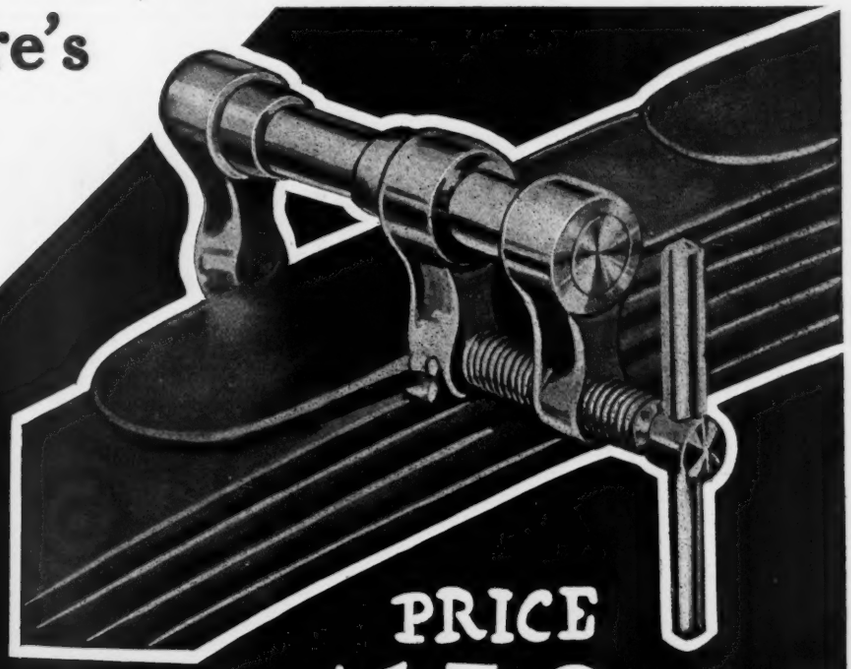
Henderson Motor Car Co., Indianapolis, Ind.



New Henderson De Luxe, $1785

51

Mr. Dealer, Here's A Demand For You To Supply



PRICE $1.50

Knowlson's Spring Leaf Spreader

THE HANDIEST LITTLE TOOL ON THE MARKET

Many motorists now recognize the fact that lubricating the leaves of the springs is as necessary as lubricating any other part of the car.

Those who are always lagging behind the procession are using the cold chisel and hammer method. Not only are they finding this method exceedingly unhandy and troublesome but in many cases they cause damage to the springs.

But the alert motorists who always know about the latest and best time, labor, and money savers on the market, know about KNOWLSON'S SPRING LEAF SPREADER. Even now they are asking for it. Will you be able to say, "Yes, I have it," when they come?

KNOWLSON'S SPRING LEAF SPREADERS are made of the highest drop forging, are nickel-plated and highly polished, weigh less than a pound and fit easily into the tool kit. Readily adjustable to any automobile springs.

The Cadillac Motor Car Co. think so well of it that every car which leaves their factory now contains one in the tool kit.

It retails for $1.50.

WE GUARANTEE THIS TO BE SATISFACTORY OR MONEY BACK. Use the coupon today. Get our dealers' proposition.

SPRING LEAF LUBRICATOR COMPANY

1004 Foster Avenue **ANN ARBOR, MICHIGAN**

Mr. Motorist: If you cannot get KNOWLSON'S SPRING LEAF SPREADER at your dealers we'll send it to you at the regular price ($1.50) prepaid. Use the coupon.

M. A.

Spring Leaf Lubricator Co.
1004 Forest Ave.
Ann Arbor, Michigan

Gentlemen:

I am interested in KNOWLSON'S SPRING LEAF SPREADER.
Kindly send me details on your proposition to dealers.
I am enclosing $1.50 for one KNOWLSON'S SPRING LEAF SPREADER.

Name .....

Address .....

City .....State.....

60 "Six" KISSELKAR 60 "Six"

The Big Six that Pioneered Downward Prices Maintains Its Leadership as a Car of Unsurpassed Ability, Elegance and Comfort

Point for point this powerful, silent, thoroughbred KisselKar 60-"Six" challenges critical comparison. Its symmetry of design, perfect poise and balance, and long, clean, graceful lines appeal irresistibly to your sense of beauty and fitness.

At first sight you feel instinctively that this big KisselKar "Six" is a car that you would be proud to own. Your first road test will disclose the exceptional riding qualities of this "greyhound of the highways." Gliding smoothly along in this superb car of comfort, you realize the utmost limit of motoring delight.

The exceptionally liberal 142-inch wheelbase, the big wheels and oversize tires, shock absorbers and eleven inches of seat upholstery reduce road vibration to the minimum. And the unusually spacious tonneau and deep pitched seats permit you to recline at ease, unaffected by the "lurches" and sidesway incident to ordinary motoring.

The lighting facilities are strikingly original, especially the illuminated instrument board and special lights that sweep the full length of the running boards, and the "bull's-eye" in tail lamp, the rays of which directly reach the gasoline gauge. The Golde patent "one man" top, Warren Speedometer, Klaxon Horn and many other features of the highest priced cars are all found in the KisselKar 60-"Six" equipment.

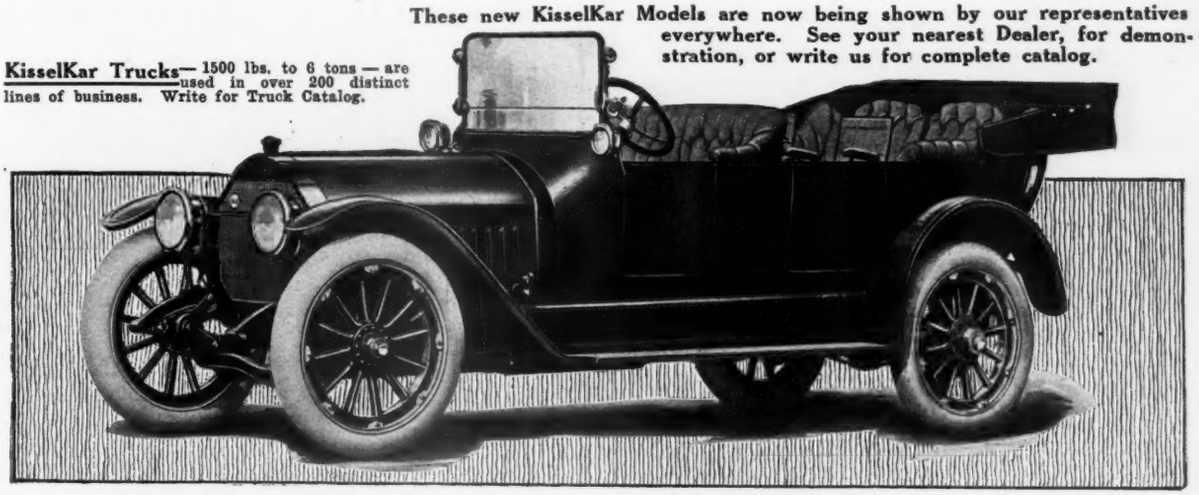
The KisselKar 60-"Six" at $3150 is a wonderful value that easily leads the "big Six" field. Price of the new KisselKar 48-"Six" is $2350; KisselKar 40-"Four," $1850. All KisselKars are fully equipped, and are electric lighted and started. They have left hand drive and center control.

KisselKar Service Contract

The KisselKar is sold under a written guarantee of service to owners—a tangible, definite and specific contract that clearly stipulates the scope of KisselKar Service and provides mechanical care that forestalls trouble and retards depreciation.

These new KisselKar Models are now being shown by our representatives everywhere. See your nearest Dealer, for demonstration, or write us for complete catalog.

KisselKar Trucks—1500 lbs. to 6 tons—are used in over 200 distinct lines of business. Write for Truck Catalog.



KISSEL MOTOR CAR CO., 121 Kissel Ave., Hartford, Wis.

BOSTON, NEW YORK, CHICAGO, MILWAUKEE, KANSAS CITY, MINNEAPOLIS, ST. PAUL, DALLAS, SAN FRANCISCO, LOS ANGELES, OAKLAND.

Philadelphia, Detroit, Houston, El Paso, New Orleans, Washington, Baltimore, Nashville, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Rochester, Providence, Montreal, Quebec, Toronto, Winnipeg, Calgary, and 300 other principal points throughout America.

75,000 Continental Motors

CONTINENTAL MOTORS
Powerful as the Nation
AMERICA'S STANDARD

OVER 3,000,000 H.P. TO HELP YOUR SALES

"The Almighty fights on the side of the heavy battalions," said Napoleon.

Every salesman knows how true that is—how he must build up his "selling talk" point by point, how he must heap reason on reason, and how back of his spoken word must stand the reputation of the article and the great force of its advertising.

And the battle as a rule goes to the side of the heaviest battalions.

Every Motor Vehicle Built around a Continental Motor Has the Biggest Factor in the Industry Backing It.

Has 75,000 Continental Motors giving world-wide satisfaction, delivering 3,000,000 h. p. in daily use—every motor in a high-grade, long-lived motor vehicle.

Offer any one of these 75,000 Continental converts a car with any other motor and your sale is 100% harder. Offer him a motor vehicle with a Continental motor and your sale is half made.

Confidence is the backbone of business, and *Continental Confidence* has been won because it has been earned. And back of every Continental-powered car is Continental advertising—the national campaign of which the first broadside is just being fired. Added to the manufacturer's advertising of the car is our advertising of the motor—the costliest and most vital factor in that car.

On the side of the heavy battalions—is that where you are lining up for the campaign of 1914?

CONTINENTAL MOTOR MFG. CO.
Largest exclusive motor builders in the world
Detroit, Mich.
Factories—Detroit—Muskegon

Don't Confuse Rebound Snubbers with Shock Absorbers

The Snubber Principle is entirely different from that of the Shock Absorber. It is as much an improvement over old-style devices as modern cars surpass the old models. We used to make Shock Absorbers—thousands of them—until the advent of modern, high-set, flexible springs demanded a radical improvement.

Today Gabriel Rebound Snubbers are the **one** device of their kind that has met the demand of modern springs. Hence they retard only the abnormal **up-stroke** of the springs, ensuring easy riding on **rough** roads without interfering with spring resiliency on **smoother roads.**

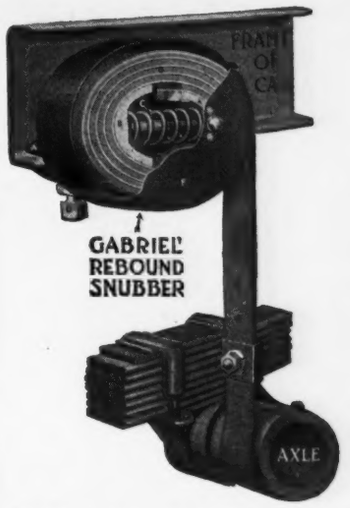
After making good two years Gabriel Rebound Snubbers are now used in increasing quantities by practically all the leading car builders, and are Standard Factory Equipment on the easiest riding cars—

PEERLESS STEARNS WHITE

Let us tell you about them. Arrange for a trial at our nearest Dealer.

GABRIEL

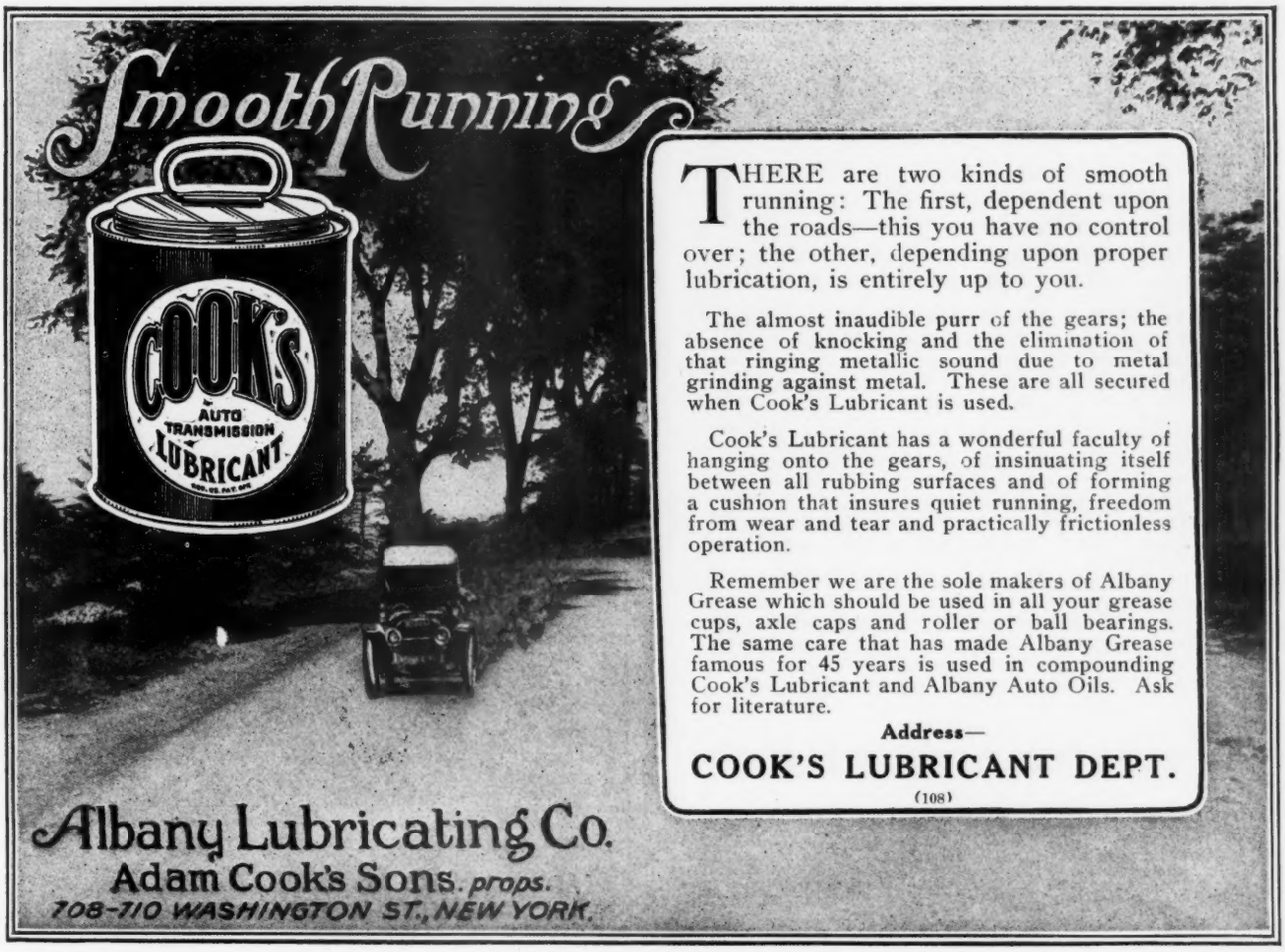
Rebound Snubbers



Easy to put on. No drilling or otherwise marring the car. Noiseless at all times. No further adjustment required and will outlast the car.

GABRIEL HORN MFG. CO., 1415 E. 40th ST., CLEVELAND, O.

Makers of the famous GABRIEL Musical Horns and Auto Accessories.



THERE are two kinds of smooth running: The first, dependent upon the roads—this you have no control over; the other, depending upon proper lubrication, is entirely up to you.

The almost inaudible purr of the gears; the absence of knocking and the elimination of that ringing metallic sound due to metal grinding against metal. These are all secured when Cook's Lubricant is used.

Cook's Lubricant has a wonderful faculty of hanging onto the gears, of insinuating itself between all rubbing surfaces and of forming a cushion that insures quiet running, freedom from wear and tear and practically frictionless operation.

Remember we are the sole makers of Albany Grease which should be used in all your grease cups, axle caps and roller or ball bearings. The same care that has made Albany Grease famous for 45 years is used in compounding Cook's Lubricant and Albany Auto Oils. Ask for literature.

Address—

COOK'S LUBRICANT DEPT.

(108)

Albany Lubricating Co.

Adam Cook's Sons *props.*

708-710 WASHINGTON ST., NEW YORK.

The Foreign Trend

The builders of motor cars abroad are constantly introducing new ideas, new body designs, new equipment, and new methods of construction.

There are wire wheels and worm drive now. And other things are promised.

But some things there, as here, are standard.

One is The Jones Speedometer.

Seven years ago The Jones became Europe's most popular speedometer.

It won the Royal Automobile Club's gold medal for all around superiority in a test that covered 2,000 miles and lasted 30 days.

It was placed on the cars of the King of England, the Emperor of Germany, the Czar of Russia, the King of Italy, the King of Spain, and the Kings of Siam, Norway, Sweden, Denmark and Belgium. The President of Switzerland and the President of France, and hundreds of other notables used it. It is used by these rulers and thousands of others on the best cars today.

No other speedometer ever gained such prestige or was ever so widely sold abroad.

No other sells there today like the Jones. The love of new things—the foreign trend—doesn't dislodge the Jones.

It is regarded as the Standard Instrument because of its accuracy. And nobody ever thinks of displacing it.

The makers of thousands of American cars are factory-equipping their product this year with the New Jones Speedometer.

They expect their cars to be used the year 'round and they know the Jones isn't affected by temperature.

The Jones is the Universal Speedometer. Makers and owners are finding this out. It is accurate, *always*. The simplest in principle. And the longest lived.

It's the product of Jos. W. Jones, the inventor of the speedometer as used on motor cars. Nothing else will ever serve like the Jones Speedometer.

Let us send you the man who knows it in detail and can give you the fullest information in regard to placing it on your car.

This is the gold medal presented to The Jones Speedometer by the Royal Automobile Club of Great Britain and Ireland. Eleven different instruments competed in the test — foreign and American Makes. The Jones made the only perfect score on seven points of superiority.

And the Jones is the only speedometer that has ever won this medal.

THE

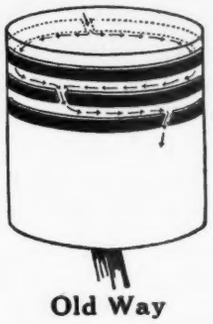
JONES SPEEDOMETER

Broadway at 76th Street NEW YORK CITY

Branches New York, Broadway at 76th St.; Boston, 109 Massachusetts Av.; Philadelphia, 1427 Vine St.; Chicago, 1430 Michigan Av.; Baltimore, 217 W. Saratoga St.; Detroit, 872 Woodward Av.; Buffalo, 20 Goodrich St.; Pittsburgh, 5904 Penn Av.; Cleveland, 1845 Euclid Av.; Charlotte, 209 Church St.; Memphis, Madison Av. and Fourth St.; Minneapolis, 800 Hennepin Av.; Omaha, 1608 Harney St.; San Francisco, 1436 Van Ness Av.; Los Angeles, 408 W. Pico St.; Portland, Ore., 71 Seventh St.; Seattle, 1710 Broadway; Indianapolis, 1201 State Life Bldg.; Atlanta, 35 N. Pryor St.; New Orleans, Baronne and Perdido Sts.; Birmingham, 18 S. 20th St.; Denver, 1600 Broadway; Newark, N. J., 283 Halsey St.; Albany, N. Y., 133 Hudson Av.

Foreign Agencies J. Millen & Son, Ltd., Montreal, Toronto, Winnipeg, Vancouver; Markt & Co. (London), Ltd., London; Markt & Co., Hamburg, Milan, Vienna, Barcelona; A. A. Kampfraath (Brussels), Ltd., Brussels, Amsterdam: Severin & Co., St. Petersburg: G. Bruggemann, Moscow; Y. D. Rose, Paris: William D. Easy & Co., Sydney, Australia; The Tarrant Motor Co., Melbourne, Australia; C. E. Helvie, Manila, P. I.; Adams, Ltd., Christchurch, New Zealand; Markt & Schaefer, Co., Rio de Janeiro, Brazil; Buenos Aires, Argentine; Mexico City, Mex.; Habana, Cuba; San Juan, P. R.

The Old Way and The Right Way



Old Way

Follow the line of arrows—this represents the course of the escaping gas. This means imperfect compression and lost power. You can't prevent this with the old-style, one piece piston rings. **Use**

TRADE-MARK-REGISTERED

PISTON RINGS

(PATENTED)

Right Way

Follow the line of arrows here—this represents the course of the gas seeking outlet—but it can't get through solid metal. Leak-Proof Piston Rings make leakage of gas between piston head and cylinder impossible. They give maximum power and minimum carbonization. Gas can't escape down—oil can't go up.

They retain roundness of cylinders. Last as long as the motor.

Insure perfect compression.

Now in Use on Over 150,000 Automobiles

"Ask the User"

A booklet on request—complete information as to how Leak-Proof Piston Rings can be applied to your piston problems if you'll write us, or call or write any of our

Branch Offices

New York—53 Lincoln Square Ct., Broadway at 64th St.
Pittsburgh—7620 Tioga St.
Kansas City—1504 Grand Ave.
Chicago—Suite 39, Merchants' Bldg., 106 N. La Salle.
San Francisco—164 Hansford Bldg.
Fort Worth—108 Bryan St.
Los Angeles—224 Cent'l Bldg.

Manufactured by

McQuay-Norris Mfg. Co., ——Dept. M—— **ST. LOUIS, MO.**

Don't Let the Dust Spoil YOUR Enjoyment!

A good deal of the fun of automobiling is spoiled by the dust, wind, smoke and insects in the air. But these will not interfere with *you* if you wear the

Leasure Sanitary Eye and Nose Shield

The only auto shield on the market with positively sanitary nose protection—prevents dust from entering the nostrils.

It leaves no mark on the face—does not cause perspiration—and doesn't leave that drawn feeling of ordinary goggles.

The LEASURE SANITARY EYE AND NOSE AMBER SHIELD will prevent sunburn. Particularly adapted to ladies' use. It is perfectly transparent—gives clear vision on all sides—and weighs but half an ounce. In amber, white, blue and green with leather case.

Price $1.00
Without case... .75

Order Direct Today

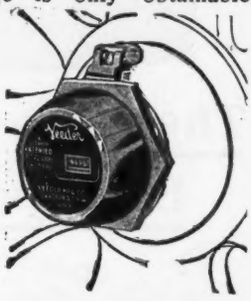
Leasure Eye & Nose Shield Co.
Sanford St., Bradford, Pa.

DEALERS: Let us tell you how you can handle this article with good profit to yourself.

Veeder

"Near Enough"—

won't do, if you want to know the *exact cost* of upkeep of pleasure or commercial vehicle. Mileage must be correct to a fraction if you are interested in tire, gasoline or "juice" and lubricating consumption. Exact mileage is only obtainable with a VEEDER HUB ODOMETER—which *can't be tampered with.*



Neat, durable and compact, it can be easy attached. Price complete, **$25.00**

At your dealer's direct from our factory or at the following agencies:

T. H. Cranston & Co., 56 E. Randolph Street, Chicago, Ill.

Bernard I. Bill, 543 Golden Gate Avenue, San Francisco, Cal.

The Veeder Manufacturing Company
C. H. VEEDER, President D. J. POST, Treasurer
H. W. LESTER, Secretary
HARTFORD, CONN.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings

Starts — Lights — Ignites

REMY

Six Volt System—Does-It-All

WE are the only factory able to assume complete responsibility for the *entire* efficient electrical equipment of your product. Remy apparatus is furnished as a whole—or in any combination. The Starting and Lighting equipment is furnished to manufacturers only.

Risk of obsolete equipment is eliminated; service demands of the individual owners are centered in one factory.

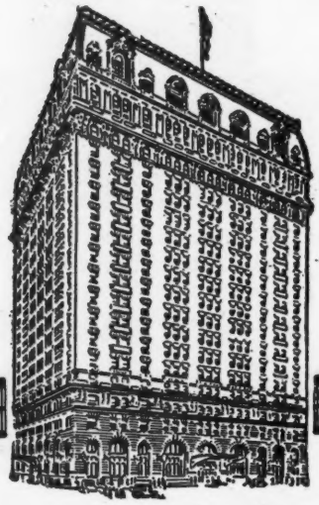
Because the Remy is a fourteen year old concern with a national service organization, you are guaranteed *permanent efficiency.*

Liberal magneto (any make) exchange offer.

Remy Electric Company
General Offices and Works, Anderson, Indiana

BRANCHES:
New York Detroit Kansas City Minneapolis
Boston Chicago San Francisco

(Service stations throughout the country)



Hotel La Salle

CHICAGO'S FINEST HOTEL

ERNEST J. STEVENS, Vice-Pres. and Mgr.

Located in the heart of the city, within easy reach of all railway terminals

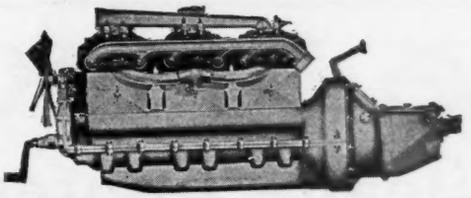
RATES

ONE PERSON	Room with detached bath	$2 to $3 per day
	Room with private bath	$3 to $5 per day
TWO PERSONS	Room with detached bath	$3 to $5 per day
	Room with private bath	$5 to $8 per day

TWO CONNECTING ROOMS WITH BATH

Two persons	$5 to $ 8 per day
Four persons	$8 to $15 per day
SUITES	$10 to $35 per day

LA SALLE AT MADISON STREET, CHICAGO



BEAVER "SIX" Unit Power Plant

Beaver "Sixes" offer the following 1914 features: long stroke (3¾ x 5); just right power, 45 H. P.; 3-point suspension; large valves with enclosed action; enclosed fly wheel; 3-speed transmission; noiseless, vibrationless, oil and dust tight action; arrangement for installation of any make Electric Starting and Lighting System. Write for catalog and prices.

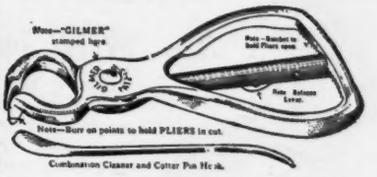
BEAVER MANUFACTURING CO.

Builders of 2, 4 and 6 Cylinder Motors

2800 First Avenue MILWAUKEE, WIS.

GILMER Tire Repair Pliers

are as necessary to Car Users as a pocket knife is to you—as useful as a hair pin to a woman. There are 300,000 Car Owners in the United States who KNOW that it pays to repair small cuts in Tires. ARE YOU ONE OF THEM?



Hadn't you best write for free copy of "Tire Insurance," or better, send a dollar for a pair of nickel plated PLIERS and combination cleaner and cotter pin hook They will pay for themselves the first seventy-five miles. They will pay for a set of Tires every 4,000 miles. We guarantee satisfaction.

G. WALKER GILMER, Jr.

53 North 7th Street Philadelphia, Pa.

You Can Walk From There to Anywhere.

THE WOODSTOCK The Hotel of Comfort

43rd St., Just East of Broadway, New York

Our new addition is ready for occupancy. We now have 360 rooms with 265 baths. Write us for descriptive folder with typical floor plan and rate card. Wire for reservation at our expense.

Rates

From $2.50 to $4.00 Per Day

W. H. VALIQUETTE

MANAGER

Also **The Berwick**, Rutland, Vt.

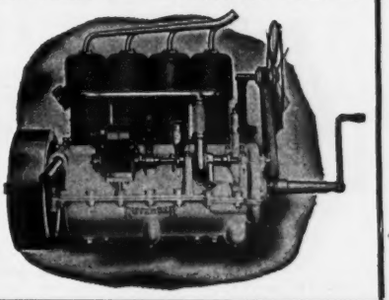
THE RUTENBER MOTOR

MANUFACTURED SINCE 1901 FOR HIGH GRADE

AUTOMOBILES and TRUCKS

3¾ x 5¼ four and six cyl.
4¼ x 5¼ four and six cyl.
Standard or Unit and
4 x 4, 4½ x 5 and 4¾ x 5 Standard Types. All L Head 4 Cycle.

Manufacturers are invited to investigate our service and our facilities. Literature on request.



The Rutenber Motor Company

Marion, Indiana

IDEAL STEEL WHEEL (RESILIENT)

STRENGTH COMFORT BEAUTY ECONOMY

IT'S IN THE SPOKES

Makes possible the use of airless tires without sacrifice of easy riding.

Doubles the life of any set of tires.

Increases life of motor and adds to the mileage per gallon of gasoline or per charge of electricity.

Makes any car ride like a cradle.

TRY THEM AT OUR RISK

Supply Dealers and Garage Owners: Write for our agency proposition.

The Ideal Steel Wheel Company

4619-4633 Spring Grove Ave. Cincinnati

Dorris

Built to Last

THE SILENT CAR

BUILT TO LAST

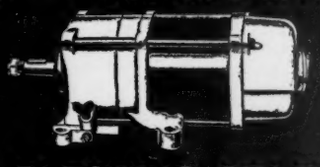
Our agency proposition will interest you. Write for it.

DORRIS MOTOR CAR COMPANY

100 S. Sarah Street St. Louis, Mo.

Jesco TRADE MARK ELECTRIC STARTING & LIGHTING

ASSURES 100% EFFICIENCY



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ADAMS & LOOMIS STS. CHICAGO, ILL.

McFARLAN

Electric Lighted **SIX** Self Starting

SERIES "S"—45 H. P., 2, 4 and 5 Pass.—$2,300
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New Six Passenger, Coupe and Limousine Bodies slightly higher.

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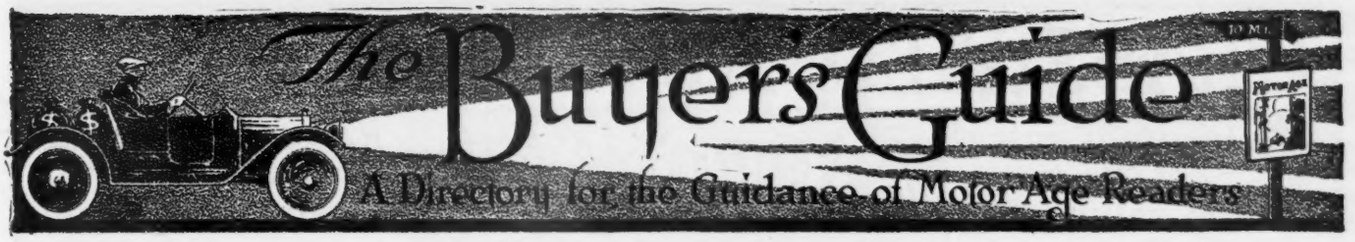

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"A Giant in Power —A Miser in Fuel"

25% to 50% more mileage

Write for illustrated descriptive booklet.

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$1.50 to $5.00 will make your top—Mohair, Leather, Imitation Leather or Cravenette—practically like new and guaranteed waterproof. No cracking or rotting—NOT varnish. Send for FREE Folder and Samples of Work.

RUB-ON MFG. COMPANY
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Automobile, Motorcycle and Bicycle Supplies

Ask for catalog "M"
Dealers only

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Guaranteed against breakage and sagging at less price than of car factories. Freight allowed on 4 or more.

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In Stock or Order
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Write for catalogue and prices.
We can save you money.
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Prompt shipments—our policy

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Solid One-Piece Separator. Full Depth of Raceways to Resist Thrust. Uninterrupted Raceways. Full Complement of Balls.

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Windshields of Character

About half of the representative cars of the United States are equipped with Troy Windshields. Write for literature.

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ALWAYS SPECIFY

HOYT METERS

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ESTABLISHED 1844.

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TRADE MARK REGISTERED APRIL 30, 1895.

The Standard American Valves for Automobile, Bicycle & Vehicle Tires

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A. SCHRADER'S SONS, INC.
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LEE Puncture-Proof *PNEUMATIC* **TIRES**

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Get Trade Proposition "U"

Lee Tire & Rubber Co., Conshohocken, Pa.

Now Is the Time

TO GET YOUR SHARE
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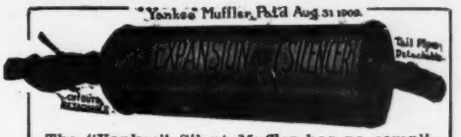
Ask Motor Age How
TO GET IT



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Counter-Balanced Ball-Bearing

AUTOMOBILE TURNTABLES

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T. C. BEACH AUTO-TURNTABLE CO.
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—Buy BETTER Springs—

Guaranteed against breakage & sagging, at less price than that of car factories.

In stock, painted for Ford, Buick, Cadillac, Chalmers, Hudson, Maxwell, Regal, Reo, and others. Send for complete list and price.

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Auto Cylinder Oil

Will not carbonize. A perfect lubricant

GREENSLADE OIL CO.

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One 150 H. P. French car for exhibition purposes. This car has record of 100 miles in 72 minutes and 45 seconds. One of the best money-making cars in country today. Has a full set of extra parts and two new Michelin extra tires.
One 50 H. P. special built car with complete line of extra parts for racing equipment. These cars are in perfect shape and ready for the track, but have to sacrifice them on account of other business.
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Phone Normal 5303.

A FINE SEVEN-PASSENGER THOMAS flyer, beautifully equipped; in perfect condition; cost new $6,000; will sacrifice for quick sale. Address Box D 486, c|o Motor Age.

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Why buy used cars when for $850.00 you can get a brand new 35 h. p. 5-passenger Continental, formerly sold at $1,450.00?
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A LATE DOUBLE "M" FORTY HORSE- power White Steamer; fine condition and fully equipped, including kerosene burner. Has not run three thousand miles. Will sell cheap. Address Box D 469, c|o Motor Age. w

AUTOMOBILES AND PARTS; LARGEST stock ever known.
Progress Brokerage Co.,
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One Twelve-passenger, sight-seeing car, Pullman body, in A-1 condition. Inquire of D. F. Poyer Company, Menominee, Mich.

FOR SALE — COLE 40, 1912; FULLY equipped, including seat covers, extra tire; perfect condition; will sacrifice. Address Box D 462, c|o Motor Age. h

FOR SALE—MATHESON SILENT SIX TOY tonneau touring car, 3 years old, in first-class condition. Completely equipped. Has top, windshield, Stewart speedometer, Klaxon horn, Flentje Shock Absorbers, Dorian demountable rims, 2 extra rims and tires, tire case and tire covers, trunk rack, trunk case with 2 suit cases, 2 storage batteries, electric side and tail lights, Prest-O-Lite headlights, Hartford power tire pump, extra tubes, tools, etc. Very speedy and snappy. Guaranteed in first-class condition. For sale or will exchange for standard car of larger seating capacity. Box D 489, c|o Motor Age.

FOR SALE—MODEL "M" FORTY HORSE- power White Steamer, beautifully equipped and in A1 shape. Has kerosene burner and works fine as silk. Will sacrifice. Address Box D 470, c|o Motor Age. w

FOR SALE—MODEL O-O WHITE Steamer in first-class shape; like new. T. M. Smith, 1969 Montrose Blvd., Chicago, Ill.

FOR SALE—10 "ATLAS" TAXICABS IN running condition at $300 each. Splendid opportunity for some one wishing to start in this money-making business, requiring but a small investment. Dan Condon, 2635 Wabash Ave., Chicago. w

KNOX 5 PASSENGER MODEL "R" 1910 touring car. 5 new casings, car equal to new, run 7,000 miles. For quick sale will take $1275.00. Yeggy-Don Sales Co., Rock Island, Ill.

G. J. G. — SPECIAL RACING MACHINE capable of doing better than 70 miles per hour mounted on English style of wire wheels with Bosch racing magneto and motor modeled so as to have the minimum of friction to the maximum of speed. Equipped with New any make selected of standard tire equipment. Write for Photograph and specifications to G. J. G. Motor Car Company, White Plains, N. Y.

LOZIER 1911 FOUR-CYLINDER BRIAR- cliff; A1 condition. Electric lights; good tires carried at the rear. Rocky Mountain radiator and extra large fan. Equipment complete in every detail. Removable tonneau making a fast powerful roadster. Nothing can trim you with this car. Will go anywhere as fast or as slow as you want to ride. No trades, cash only. C. L. Newcomb, Jr., 768 Franklin Street, Denver, Colo.

MITCHELLS, REBUILT, GUARANTEED.
These cars are fully equipped. Call or write for further particulars.
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UNDERSLUNG ROADSTER, SIXTY HORSE power; four speeds; 136-inch wheel base, 40x4½ tires; floating axle, imported bearings, complete with electric system; run hundred miles; worth three thousand—quick sale $775.00. Address W. S. Reed, Martinsburg, West Virginia.

1912 DETROITER FIVE-PASSENGER touring car, in excellent condition, for $500 cash; all tires good, Prest-O-Lite, top and complete outfit of tools. J. O. Maland, Frost, Minn.

A Good Reason
"We do not care to repeat the advertisement in reference to the Knight car at this time. We sold it through the MOTOR AGE advertisement. That's why."
H. H. W.

Parts and Accessories
FOR SALE

A BARGAIN; STORAGE BATTERIES, 6-80 and 6-160; guaranteed; all makes, new and used, $3.50 to $10 for short time only. 4105-7 Cottage Grove Ave., Chicago. a

ACME REPAIR PARTS
We carry a complete stock of parts for all types of Acme cars. Can ship promptly. Adam E. Arnold, 212 S. 11th St., Reading, Pa.

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Having purchased the repair business of the Henry Motor Co., we are prepared to fill orders promptly for repairs for Henry cars.
Muskegon Automobile Co.,
Muskegon, Mich.

AUTOMATIC SPEEDER AND PRIMER.
Every car owner should have one, saves 25% on gasoline, starts motor with first turn of crank. The most rapid selling automobile device on the market. Agents wanted. Price, $7.50 f. o. b. Frankfort. Automatic Device Co., 551 E. Jefferson St., Frankfort, Ind.

A WHITE STEAMER GENERATOR AND burner, almost new. Will sell cheap. Address Box D 245, c|o Motor Age. w

AUTO OWNERS IN SMALL TOWNS.
You can save one-half your tire expense and nearly all your tire trouble by using Security Reliners. Many of our customers run their cars the entire season without blowout or puncture and without spending a cent for tire repairs.
YOU CAN DO IT YOURSELF.
If we have no dealer in your town you can get a trial order at the dealer's price, and make a good profit selling to your neighbors. If you run your own car write at once for our plan.
SECURITY RELINER CO.,
301 Spring St., Montgomery, N. Y.
248 W. 54th St., New York.

BALL & ROLLER BEARINGS,
All Types and Sizes.
We also repair or exchange all makes of ball bearings.
THE GWILLIAM CO., 253 W. 58th St., N. Y.
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BARGAINS.

New Mohair Tops, complete with side and storm curtains suitable for Fords, Buicks and Flanders touring cars	$11.85
1 Gal. Brass Polish	.40
Gas Lamps (black and nickel), 8½"	4.25
Tail Lamps (brass)	1.00
30x3 Inner Tubes (new)	2.25
30x3½ Inner Tubes (new)	2.75
Electric Horns, complete	4.00

Terms cash with order. Money back if not satisfied.
Erwin Greer & Co.,
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BARGAINS—BARGAINS—BARGAINS
Is the only thing we handle, from a cotter pin to a complete car. Small and high-powered cars, engines, frames, bodies, axles, radiators, transmissions, magnetos, tops, etc. Before buying let us quote.
Pacific Motor Car Exchange Company,
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BARGAINS IN SPARK PLUGS, SCHEBLER carburetors, metal polish, etc. Get illustrated bulletin. Automobile Appliance Co., 1712 S. Michigan Ave., Chicago, Ill.

BERGDOLL REPAIR PARTS.
The repair business of the Bergdoll cars, together with all drawings, jigs, patterns, etc., has been purchased by us. We have a complete stock of repair parts for all models on hand and orders for parts for Bergdoll cars should be placed with us direct to save time.
Louis J. Bergdoll Motor Co.,
124 N. 3rd St., Philadelphia.

CUT-OUTS.
E.M.F., Flanders, Buick, Regal, etc. Complete outfit with brass lock open pedal, $1.50.
Lincoln Machine Shop, Lincoln, Ill.

DRAGON REPAIR PARTS.
We manufacture and keep on hand all repair parts for the Dragon cars. We make a specialty of repairing this machine. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

DEALERS,

It will pay you to get on our mailing list. We save you money on everything.
Write for prices on any special needs.

The Barrier-Sawin Co.,
State Life Bldg.,
Indianapolis, Ind.

"FOOL PROOF."

Try the Atwater Kent system of ignition. Always works and will pay for itself in gasoline saved. Their price, $50.00. We have 80 sets and will sell at $18.00 each. Ask for bargain sheet. Puritan Machine Co., Detroit.

FORD AGENTS—WE MAKE A SPECIALTY

of Dust Hoods to cover top when clashed down, for Model T Ford 1910-1911-1912-1913 cars. Write for prices. Will save you money. The H. A. Hawes Storm Front Co., Coldwater, Mich.

FORD FAN BELTS, WOVEN COTTON AND

silk; outlasts six regular belts. Postpaid, 60c. Dealers, write. Angier's, Streator, Ill.

FORD LIGHTING OUTFITS $5.50.

Includes parabolic reflectors, tungsten bulbs, wiring switch and free delivery. Truscott Auto Supply Co., St. Joseph, Mich.

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You will save trouble and money by installing our timer elevating device.
Ford Parts Specialty Co.,
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FORD OWNERS—OUR SPARE DEMOUNT-

able wheel cures tire trouble on road. Doctors, attention. Write Angier's, Streator, Ill.

FORD OWNERS—WE CAN MAKE YOUR

car the easiest rider made with light or heavy load; no jolts, no jars, no upthrow. Write us. Thomas Auxiliary Spring Co., Canisteo, N. Y.

FORD OWNERS: THE BLACKBURN

Autolock Switch offers you Certain-Teed Theft Insurance. Yale key for plug. Price $5.00. Money-Back Guarantee. At your dealer or Blackburn Specialty Co., 1134 Prospect Ave., Cleveland, Ohio.

FORD, HUPP AND MAXWELL

Muffler cut-out, machined ready to attach, including lock open pedal string and cables, $1.35. Lincoln Machine Shop, Lincoln, Ill. c

FORD T. OWNERS.

Foot throttle or accelerators, $1.50. Lincoln Machine Shop, Lincoln, Ill. c

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AT

CUT PRICES.

To reduce stock we are offering big reductions on all our standard Fore-Doors. Write today and secure a bargain while they last.

Address Dept. A.
Auto Specialty Manufacturing Co.,
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FOR SALE

1 60-H. P. Thomas motor, $100
1 35-H. P. Northway motor, $125
Pope-Toledo parts for sale.
Auto Salvage Co.,
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GET WRIGHT

RADIATORS FOR REPLACEMENT.
Built for any car made. Prompt shipment. Get our prices.
SPECIALS THIS MONTH:
Buick 17—$34.00 Velie 30—$30.00
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WRIGHT COOLER & HOOD CO.,
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$18.00. Ford outfits $4.00 complete. Fred Allen Automobile Supply Co., 1610 S. Michigan Ave., Chicago, Ill.

GUARANTEED BATTERIES.

6 volt 140 Amperes	$16.00
6 volt 80 Amperes	13.00
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The Ampvo Battery Co.,
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Ford lighting outfit, Ediswan base, complete, with genuine Tungsten bulbs	$10.00	$ 2.95
Ford Master vibrators	10.00	5.60
Ford Slip Seat covers, complete	20.00	10.50
Ford oil gauges	1.00	.19

Send for our 96-page cut price illustrated catalogue.
Liberty Tire & Supply Co.,
102 Chambers Street, New York City.

GUARANTEED RADIATORS

For all cars. The following is our stock list of radiators for the cars mentioned, subject to immediate shipments. Compare our prices with other lists.

Ford Model "T"	$18.00
Buick 10-32-33-14	27.50
Buick F-16-17-19-26-27-28	35.00
Buick 38-39	42.50
Hudson 20	33.00
Chalmers F-40	30.00
Lion 40	25.00
Warren 40	28.50
E-M-F 30	30.00
Flanders 20	30.00
Brush A-B	17.00
Anhut	15.00
Northern C	32.00
Wayne 30	35.00
Special 40 H. P.	15.00

Terms: One-third cash with order, balance with order.

When ordering state year.

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453 Trombly Avenue, Detroit, Mich.

More Than Satisfied

"Please change our advertisement to read as per enclosed matter. Run until further notice. We have steadily secured excellent results from our ads in MOTOR AGE and are more than satisfied."

L. D. S.

"IS YOUR FORD CAR SAFE?"

"No, it is not"
Without "Cranklock." Don't wait. Write today.
H. C. Fairchild, Mfr., Maplewood, N. J.

KEROSENE FOR AUTOMOBILES.

Our new Model B uses successfully half and half mixture lowest grades kerosene and gasoline. Satisfaction guaranteed or money refunded. Greatly increased power; very slow speed or high. Starts easy at zero. Special agents' prices. Dept B.
The Air-Friction Carburetor Co.,
Dayton, Ohio.

LAMPS, BLACK AND NICKEL, $9.50 PER

pair, worth $20.00; bodies, four-passenger, fore-door, untrimmed, $20.00; Stapley compound foot pumps, $2.85. Get our bulletin. Automobile Appliance Co., 1712 S. Michigan Ave., Chicago, Ill.

LANDAULET BODY.

For any Straight sill. This body is in A No. 1 condition and will prove a bargain to the first purchaser.
Modern Autop Co.,
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LION REPAIR PARTS.

We have on hand a complete stock of repair parts for all models of Lion Cars.
Lion Motor Parts Co.,
124 N. 3rd St., Philadelphia, Pa.

LATEST FORD ROADSTER BODY, $35.

Tops, curtains included. MacInnis Bros., Toledo, O. r

LOSS OF POWER

Caused by
CARBON.

90% of all your engine trouble is the result of carbon in the cylinders. You can eliminate this by using M. H. B. CARBON REMOVER. Acts like magic. Apply it yourself. Instructions on every can. Guaranteed to do the work or money refunded. Price $1.00 per quart, prepaid. Use 2 ounces (liquid) to one gallon of oil. Dealers write for special proposition.
Interstate Mfg. Co., Inc.
Walliston, Mass.

MR. (FORD) OWNER AND GARAGE MAN.

The Townsan Valve Adjuster has a cushion for your valve-stems. Takes away the click, absolutely silencing the valves. No screws or burrs to work loose. Saves putting in new push-rods and valve-stems. They never wear out. Price $1.50 by mail. Ask your jobber, or address Townsan Auto Specialty Co., Mitchell, S. D.

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We purchased the repair business of the Mora Company and have in stock repair parts for all models of Mora cars. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

MAGNETOS: WE HAVE 2,000 MODEL X

Splitdorf Magnetos, new. Price, without coil, $17.50 each; with coil, $25.00 each.
The regular price of these is $75.00.
We also have other makes of magnetos at cut prices, in fact, everything for the automobile. Send for "OUR PRICE WRECKER"—the greatest money-saver in the world.
TIMES SQUARE AUTO CO.,
1210 Michigan Blvd., Chicago, Ill.
S. W. Cor. 56th St. & Broadway, N. Y. City.

ONE MODEL 121 SPECIAL BOWSER GAS

Wheel Tank for sale.
North Iowa Motor Sales Co.,
Mason City, Iowa.

ONE NEW DEACO ELECTRIC LIGHTING

System for sale. Cost $125.00. Will dispose for $65.00 cash. Address W. Smith, 3350 Calumet Avenue, Chicago, Ill.

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section will interest every live wire salesman. Just turn to page 109 and look it over, we know it will interest you. Look for the name QUICK-KNICK.
Forest City Sales Co., Fremont, Nebr.

OXY-ACETYLENE WELDING AND CUT-

ting Machine. The Admiral Welding Machine is built by men who know; large capacity; self-generating; portable; perfect for all classes of work. Send for booklet, "Welding and Cutting." Price, with Welding and Cutting Torches, all Filler Rods, Fluxes, Chemicals, etc., ready to begin earning big money, $250.
We do expert welding; prices right.
Admiral Welding Machine Co.,
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To order for all cars,
We use copper fins and tubes.
You can buy brass cheaper, but the cooling efficiency is not there.
Black enamel, baked finish, $2.00 extra.
Terms cash with order, or one-third deposit with C. O. D. shipments.
$5.00 Trade Allowance for old radiator shipped in F. O. B. Detroit.

Ford Model T	$22.00
Ford Model R. S. & N	28.00
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Hupmobile 1912-13	38.00
Warren 1910-1911-1912	35.00
Packards to sample, $50 to	65.00
E. M. F. 30	35.00
Flanders 20	30.00
Patterson 30	35.00
Buick 10-14-32-33	30.00
Buick 16-17-19-26-27-28	35.00
Hudson 20	32.00
Hudson 33	40.00
Cadillac 30	35.00
Paige 1910-1911	28.00
Paige 1912	30.00
SPECIALS.	
One pair Solar eclipse headlights	35.00
Gabriel horns, 1, 2 and 3 tubes, $5, $7.50.	10.00
Lion 40 Racing roadster model	700.00
Bullet electric lamps, per pair	10.00
Prest-O-Lite tank, small	9.00
Prest-O-Lite tank, large	12.00
Leather runningboard trunks, with two suitcases to fit, bargain	15.00
17-inch rubber covered steering wheel	2.00
Nonpareil horn bulbs	.35

HURON RADIATOR & LAMP COMPANY,
253-255 Jefferson Ave., Detroit, Mich.

PANEL AND TRUCK BODIES
of special design particularly for the economical handling of merchandise. Ornamental bodies of exclusive style built to order; good and high-class painting. Get our estimates.

Fargo Motor Car Co.,
1164 W. 22d St., Chicago.

RADIATORS—NEW GUARANTEED GOODS

Ford, Model T	$16
Buick Model 10	22
Buick Model F	25
Chalmers-Detroit	20
Everett	20
Stoddard-Dayton	25

Any other make required at equally low prices.

Times Square Automobile Co.,
1210-1212 Michigan Ave., Chicago.

REAL BARGAINS IN MOTORS

Unit power plants, radiators for all standard makes of cars. Windshields $7. Side oil lamps, brass or black, $2.75 pair. Gas or electric head lights, 8½ to 9 inches, $6 per pair. $1 spark plugs 20c. Universal joints, steering gears and other parts for cars at bargain prices. Write today to

Nichoalds Company

424 Grand River Ave.,
Detroit, Mich.

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THESE QUOTATIONS GOOD FOR FIFTEEN DAYS

Waterproof seat covers for Ford cars, complete	$13.00
Tops to fit most any car. Send in your measurements.	18.00
Four cylinder air-cooled motors, new	60.00
Four cylinder water-cooled motors, new	80.00
Shaft drive rear axles, new	45.00
Weed's R-O-S Tire Chains, 30x3½, per pair	2.65
32x3½, per pair	2.80
34x4, per pair	3.20
Send for our bargain sheet on other sizes.	
Spark plug tire pumps	8.50
Hupp radiators, new	33.00
Chalmers radiators, new	40.00
Cole radiators, new	40.00
Overland radiators, new	42.00
Oldsmobile radiators, new	20.00
Mitchell radiators, new	20.00
Jackson radiators, new	15.00
Ford Model T radiators, new	18.00
Fire extinguishers, each	.40
Rubber mats for Ford cars, each	1.00
Tite-Wad rubber putty, per outfit	.80
E. Z. Presto starters	3.00

Send for our bargain sheet on job lot tires, tubes and reliners.

AUTO PARTS CO.,

513-15-17-19-21-23-25-27-29-31 Jackson Blvd.,

CHICAGO, ILL.

"SAVE YOUR GASOLINE."
We have 150 Rayfield carburetors, regular $20.00 kind. Our price, $8.20 while they last.
PURITAN MACHINE CO.,
415 Lafayette Blvd., Detroit, Mich.

SCHEBLER MODEL "L" CARBURETORS, new, 1¼ or 1½-inch, $8.00 each. Order early. Kent Motor Car Co., Kenosha, Wis.

SEAT COVERS FOR ALL CARS—SPECIAL price on Fords. We clean old covers; make them look like new. Auto Cape Top Co., 2334 Michigan Ave., Chicago.

TOURING, ROADSTER, RACING BODIES, Seats, special and stock sizes. Radiators, hoods, tanks and fenders for any car. Get our prices.

Auto Sheet Metal Works,
1534 Michigan Ave., Chicago.

SPECIAL BARGAINS

Two cylinder opposed water-cooled motor, second-hand	$45.00
Two cylinder opposed air-cooled motor, same as used in the Sears cars	50.00
Two cylinder opposed water-cooled new motor, complete with oiler, carburetor and timer	45.00
Demot planetary transmissions	15.00
Four cylinder Cameron air-cooled motors, new	60.00
Four cylinder Continental motor, second-hand, overhauled	70.00
Four cylinder 60 H.P. Haynes motor, second hand	100.00
Sheldon one-ton truck axles, per pair	35.00
Sheldon jack shaft, complete	35.00
Randolph one-ton truck wheels with rims, per set of four	10.00
Artillery type wood wheels, 30x3 to 36x3½, per set of four	12.00
Pressed steel frames, nearly all sizes, each	5.00
Three-cylinder, two cycle, air-cooled new motors	75.00
Steel battery boxes, with lock, each	1.50

CUT PRICE AUTO SUPPLY HOUSE

438 Rush St.,

CHICAGO, ILL.

Positions Filled

"I have filled the positions referred to, and have received numerous applications, so discontinue the ad. Rest assured that when we need additional salesmen, we will take pleasure in giving you the advertisement." E. H. C.

TOPS BUILT, RECOVERED AND REpaired.
C. G. Meyer & Son, Tiffin, Ohio.

TRUFFAULT-HARTFORD SHOCK ABsorbers; $45.00 kind; $20.00 set of four.
PURITAN MACHINE CO.,
417 Lafayette Blvd., Detroit, Mich.

UNION OXY CARBIDE CO.
Manufacturers of Portable (weight 40 lbs.) and stationary welding, cutting or lighting plants; supplies of all kinds. Agents wanted. Fulton & Enfield Sts., Brooklyn, N. Y.

WE NOW HAVE BUT A FEW 30-35 AND 35-40 H. P. motors ready for shipment. Complete with magneto, coil and clutch. F. E. Alford, Goshen, Ind.

WESTON MOTT HIGH GRADE REAR axles, $45.00. Other bargains, too.
PURITAN MACHINE CO.,
413 Lafayette Blvd., Detroit, Mich.

WILL SELL 10-GAL. GASOLINE TANKS, same as used in 1913 Ford, at $2.00 apiece f. o. b. Toledo. MacInnis Bros., 120 22nd St., Toledo, O.

WRITE THE GUN METAL FINISH CO., 313 Powers Blk., Decatur, Ill., for free samples of ELECTRO-KNICKEL POWDER, for plating automobile trimmings. Will put on as heavy a coat of metal as an electroplating bath.

5½x5 TWO-CYLINDER DAVIS TRUCK motor with magneto coil and carburetor, practically new, $200.00. Power Equipment Co., Minneapolis, Minn.

50 NEW PRESSED STEEL FRAMES 163" long, 34" wide. Each $10.00. Send for sketch.
Lucas & Son, Bridgeport, Conn.

Cars Wanted

FORD CAR STOLEN
License No. 74987 Ill, Car No. 165791, Engine No. B8862. Notify M. Bristle, Sheriff, Ford County, Ill., and obtain reward of $50.00.

FOR SALE OR TRADE — OKLAHOMA farm for a car. 160 acres nice level land, best of soil, all fenced and comfortable house in a good farming country. No incumbrance and title good at $20.00 per acre. No less. Will take a car as part payment if in good running order and priced right. Don't write, but come and see. Reference, the Bank of Texline. A. L. Stone, Texline, Tex.

FOR TRADE—110-ACRE FARM IN INDIANA clear of debt; small improvements. Will take the value in new or second hand cars. E. B. Collins, Danville, Ill.

WANTED—TO TRADE QUARTER SECtion of land in Wayne county, Missouri, with improvements, for a good touring car. Address Lee Mathias, care Corporation Counsel's Office, Chicago, Ill.

WANTED — 1913 MODEL 4-PASSENGER Hupmobile; slightly used. Cash for a bargain. R. D. Bryan, 1002 John St., Palestine, Tex.

For Sale or Exchange

FOR SALE OR TRADE
A one-ton Buick truck. $700, if taken at once.
A large 1910 5 passenger 40 H. P. Mitchell, detachable tonneau, 4-inch tires; will make fine truck and pleasure car combined, $450.
Albany Automobile Co.,
Albany, Wis.

Parts and Accessories WANTED

MANUFACTURERS OF NEW AUTO SPEcialties suitable for a mail order trade. Write H. K. Buchanan, Austin, Texas.

WANTED — PREST-O-LITE TANKS. WE pay tthe following prices:

A. Presto Tanks (large)	$9.00
B. Presto Tanks (medium)	7.50
E. Presto Tanks (small)	6.00

Ship in any quantity C. O. D. or S. D. B. L.
ERWIN GREER & COMPANY,
1456-64 Wabash Ave., Chicago, Ill.

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A1 AUTO REPAIRMAN, ELECTRICIAN, expert on ignition and carburetion. Strictly sober and industrious. Good references. Address Box D 490, c|o Motor Age.

AUTOMOBILE ENGINEER WITH EIGHT years' designing and 12 years' shop experience with exceptional mechanical, inventive and executive ability, seeks a situation in production or engineering. Write Box D 477, c|o Motor Age.

AUTOMOBILE MECHANIC OF 7 YEARS' actual service desires a position with automobile or gasoline engine company for services in South America or Southwest part of U. S. Address Box D 472, c|o Motor Age. l

FORD REPAIRMAN AND DEMONSTRAtor, one who knows the business thoroughly, wishes to make change. Also experienced on practically all cars. Married. References. Address Box D, 488, c|o Motor Age.

POSITION WANTED AS SALESMAN OR demonstrator by reliable young man having four years' experience. Can give bond and furnish references. Address Box D 467, c|o Motor Age. b

WANTED—A POSITION AS ASSISTANT manager in garage; have had 12 years' experience; best of references. Address Box D 475, c|o Motor Age. s

POSITION WANTED BY AN EXPE- rienced mechanic and driver, with some northern owner of a high-grade automobile, as chauffeur during the summer and fall; absolutely sober and reliable; for further particulars address Box D 447, c|o Motor Age. r

Help Wanted

ENGINEERS, SUPERINTENDENTS, Works Managers, Designers, Production and Efficiency Engineers, and Draftsmen with automobile experience. Inquiries confidential; record must stand investigation when desired. The Engineering Agency, Inc.—20th Year—Chicago.

WANT DRAFTSMEN EXPERIENCED IN detail work. Please state experience, age and wages desired. Moline Automobile Company, East Moline, Ill.

WANTED AT ONCE
Competent general repair man for steady position. Give reference and full particulars as to wages expected and past experience.
Fredericksburg Auto Co.,
Fredericksburg, Iowa.

60 HIGH GRADE MEN WANTED
For all lines of the automobile industry. The Toledo Engineering Agency, Toledo, O. H. L. Croy, M. E., Mgr. Member S. A. E.

Business Opportunities

ESTABLISHED TAXICAB SERVICE IN city of forty thousand for sale. Owner has other business reason for selling. Cars in fine condition. Address Miller's Taxicab Service, Aurora, Ill.

FOR SALE—A GARAGE 50x116 FEET IN town of 2,000; only garage in town; 2 car agencies; sold 45 cars so far this season; good machine shop and large accessory line; takes about $12,000 to handle business. Owners have other business that requires their time. Address Lemmon Auto Co., Lemmon, S. Dak.

RECEIVER'S PUBLIC SALE.

By order of the Court, the valuable plant, machinery, tools and stock on hand of the Grout Automobile Co., Orange, Franklin County, Mass., will be sold to the highest bidder on Thursday, September 4, at 2 o'clock p. m., on the premises.

The real estate consists of the well known Grout factory, built of brick, stone trimmings, one of the best built sets of buildings to be found in the state for manufacturing purposes, built for the carrying of heavy machinery, well lighted, equipped with 75 horsepower Dillon boiler, 50-horsepower Brown engine, also equipped with electric power, separate heater for paint, department can be used when desired; first building two stories, main building three stories; 38,000 square feet of floor space, fully equipped with shafting machinery, pulleys, belting, elevator for handling cars and merchandise; two store houses besides brick store house for storing oil; two gasoline tanks holding 600 gallons, connected with pump in building; two-story two-tenement house, modern; 15 acres of land; doing a repair business of easily $30,000 a year, which can be increased. The factory is located on East Main St., the main thoroughfare for automobiles between Boston and the west, making it one of the most desirable propositions ever offered at public sale for parties desiring to engage in either manufacturing and repairing of automobiles or repairing and selling of automobiles, or, in fact, any business requiring a substantial building for manufacturing of any kind.

The plant will be open for inspection from August 9 to date of sale.

Send for catalogue.

RUFUS T. SHUMWAY, Receiver,
Orange, Mass.

FOR SALE—GARAGE, LIVERY AND RE- pair shop; new R. R. $2,500 takes it with two cars. Center Garage, Center, Colo.

FOR SALE—AUTOMOBILE TIRE AND supply store doing thriving business in N. W. city; no competition. For particulars address Box D 484, c|o Motor Age.

FOR SALE—IN NORTHERN ILL., GOOD equipped auto and tire repair shop; fine location, plenty of work, lots of cars and an A1 place for a good repairman. Reason for selling, wish to go west. For full particulars address Box D 452, c|o Motor Age. f

HALF INTEREST FOR SALE
in patents and profits of a successful automatic tire pump. Manufactured and financed by responsible concern. Standard equipment on a leading car. Address Box D 487, c|o Motor Age.

WANTED—MANUFACTURER
for a spark plug. Address Estes & Inman, Midland, Tex.

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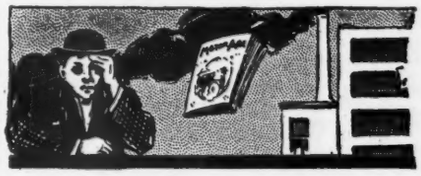
ENGLEBERT TYRES.
Made in Belgium.
Standard in all sizes. Guaranteed 4,000 miles.
New and Second-Hand Tires at a Great Reduction.
Send for Circular on Repair Work.
Colonial Rubber Works,
46-52 E. 28th St., Chicago.



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"Enclosed find check in payment for advertising in MOTOR AGE, two insertions. We have had good results from this ad and you will herewith find enclosed copy for six more insertions." A. H. Y.

NON-SKID TIRES.
All standard makes at the following prices:

Size	Price	Size	Price
30x3½	$14.50	34x4½	$27.00
32x3½	16.00	35x4½	28.00
32x4	20.00	36x4½	29.00
34x4	22.50	36x5	31.50
36x4	24.50	37x5	32.50

I do not carry any but standard make tires or deal in inferior brands. I will ship any size tire listed above to any part of the U. S. upon receipt of 10% of order, balance C. O. D.

M. C. MORAN,
334 Amsterdam Ave., New York City.

TIRES.
New and Slightly Used Tires Far above the average. Our success has demonstrated that our goods are right and a trial will convince you. Send for circular NOW.
Serlin Tire Co.,
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Well known make of new factory second tires in two sizes only. 34x3½ Q. D. clincher or regular clincher, smooth, at $9.50 each. 30x3½ Dunlop or straight side, smooth, $8.25 each. Will furnish Goodyear rings at $.75 each with tire order. Ten per cent with order, balance C. O. D., subject to inspection. Kastner Tire & Rim Co., 2112 Michigan Ave., Chicago, Ill.

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MAGNETOS
Repaired, remagnetized; prompt service on all makes.
Get our exchange proposition on new K-W for old equipment.
Spark Coil, Storage Battery and Carburetor Repairs.
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CHICAGO PORTABLE GARAGE CO., Makers of the "better kind" of portable garages at popular prices.
They are simple to erect, are durable, and possess a style of exclusiveness.
Full particulars concerning material, sizes and prices mailed for the asking. Why not write now?
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GOOD PRIVATE AUTO GARAGES $58 up, 14 sizes; wood and steel; well built and sold at honest prices. Write before you buy. J. A. Catherman, Beaver Springs, Pa.

PINYOUN'S PORTABLE GARAGES.
Built to last.
These are not light, flimsy structures, but solid, substantial, stylish garages that are guaranteed to give years of service & satisfaction. Descriptive literature for the asking.
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2530 Carnegie Ave., Cleveland, Ohio.

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AUTOMOBILE REPAIR AND MACHINE shops should send for our catalogue of W. B. Phosphor Bronze Bushings; 350 stock sizes listed. Wm. B. Anderson Foundry Co., 24 So. Clinton St., Chicago.

COMPLETE "VULCAN PROCESS"
of oxy-acetylene welding plants from $175 for the blacksmith and garage plant up to largest made. Torch light weight. Does not backfire in ordinary work.
Write today for our booklet on welding.
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25th and University Ave. S. E.,
Minneapolis, Minn.
Send us $1.00 and receive illustrated cloth bound book on practical welding.

SAVE $300 TO $400
on autogenous welding outfit by buying torch, retort and instructions for $50 and make it yourself. Nothing better or cheaper. Address M. E. Armstrong, Austin, Minn.

Rebuilding and Repairing

AUTOMOBILE CYLINDERS REGROUND, new pistons and rings fitted. Garage Air Compressors. Cast Iron Brazing Co., Manchester, N. H.

AUTOMOBILE REPAIRING OF THE highest class at prices that are fair to both parties has made possible our reputation for reliability. Estimates cheerfully furnished. Barrett Automobile Repair, 150 E. Indiana St., Chicago. Phones: North 7511, Automatic 43-482.

CYLINDERS REGROUND, NEW PISTONS

and rings fitted, gear cutting, of all kinds and materials, transmission and bevel gears, piston pins and push rods of chrome nickel steel, hardened, tempered and ground; guaranteed better than factory; old piston pins reground and fitted to your new pistons; old push rods reground and furnished with new guides, crank shafts, connecting rods, valves, crank cases, any part for your auto or motor; reproduced same as original but better; phosphor bronze bushings carried in stock. Send old or broken parts to go by. The shop of quality.

McCadden Machine Works,

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CYLINDERS REGROUND AND FITTED with new pistons and rings for $7 to $11 per cylinder. We do this class of work exclusively and are thus able to give you the highest class of work at these prices. The Crown Machine Shop, Crown Point, Ind.

CYLINDERS REGROUND and fitted with new pistons and rings for $15 per cylinder. We make parts and cut gears of all kinds. Send us your old parts and we will repair or duplicate them in record time. Cracked cylinders, gear cases, etc., welded and made good as new. Aluminum, bronze and brass castings of every description. The Adapt Machinery Co., 1624 Wabash Ave., Chicago, Ill.

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Auto parts duplicated for any make of car. Wrecked cars and trucks rebuilt. Send the broken parts to us if the maker of your car cannot duplicate promptly.
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Expert repairers and reglassing of all kinds. All work guaranteed. A trial will convince you. 1919 S. Wabash Ave., Chicago.
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EXPERT VULCANIZING GUARANTEED.
Our low prices and quick deliveries have made us famous. Ask for our list of used tires.
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. A-A-A RADIATORS MANUFACTURED and repaired. Radiators of any make repaired and returned same day. We can make any style radiator and ship in three days.
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AA1 AUTO LAMP REPAIRING.
All Radiators Repaired
by expert workmen.
All work guaranteed by the
Michaud Metal Works, 1615 Wabash Ave.,
Chicago. Tel. Cal. 5286; Auto 67-337.

ALL KINDS OF AUTO RADIATORS, hoods, fenders, lamps and windshields, etc., rebuilt and repaired. All work guaranteed. Also general sheet metal works. Phone or mail order. L. Blumenfeld & Co., 1919 Wabash Ave., Chicago. Tel. Cal. 4583.

ARROW RADIATOR REPAIR CO.,
1331 Wabash Ave., Chicago.
Expert repair work on Radiators, Hoods, Fenders, Dashes, Tanks and Drip Pans. We guarantee all our work. Phone Cal. 1995.

CHICAGO MANUFACTURING COMPANY,
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We are the only radiator manufacturers in Chicago making a square tube radiator. New guaranteed cores placed in old radiators. We also manufacture Hoods, Fenders, Tanks and Pans and do guaranteed repair work. Prompt service.

ILLINOIS AUTO SHEET METAL WORKS, 58-60 E. 16th St., Chicago, Ill. Manufacturers and repairers of Radiators, Hoods, Fenders, Tanks, etc. Cores built in old radiators. We do expert repairing, at lowest price. Calumet 1191.

ONLY RADIATOR FACTORY IN NORTHwest. Eleven years' knowing how. Why send your Radiator down East when you can ship it to us; save Time, Express, Freight, Money, and get best workmanship. Prices right. Make new Radiators; allow for old one.
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THE M. & L. AUTO SHEET METAL Works rebuild and repair radiators, hoods, fenders, tanks, lamps, etc.
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AMERICAN WELDING CO.,
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Autogenous welding of all metals, such as crankcases, cylinders, etc. We positively guarantee all work. Tel. Calumet 3563.

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All metals brazed and welded are guaranteed. Experts in aluminum welding. Send for circular on aluminum welding. 1615 Wabash Ave. Tel. Calumet 5286.

BROKEN CRANKSHAFTS, CRANKCASES, cylinders, flywheels, gearteeth, pistons perfectly welded and machined, ready to replace. Scored cylinders made new. Booklet. Atlas Welding Works, Rahway, N. J.

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Springfield - Boston - Hartford - Holyoke-Bridgeport. Aluminum cases and cast iron cylinders a specialty. Five shops with five years' successful experience.
Ask for our printed guarantee.

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WELDING
Cast iron, aluminum and all metals.
National Welding & Mfg. Co., Inc.,
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WE WELD AND ABSOLUTELY
Guarantee
our welds to hold, cylinders (cracked in or outside), crankshafts, aluminum crankcases, transmission cases, housings, etc., by the Oxweld process of welding and cutting metals.
Estimates furnished for job or repair welding and cutting operations of all kinds. Oxweld Acetylene Co., 37th St. and Jasper Pl., Chicago, Ill. Downtown receiving station, 557-561 W. Jackson Blvd.

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AA1 IS HOW OUR STUDENTS STAND with auto owners. Our school is the oldest, best equipped, most practical and successful in America. Write, phone or call for particulars. Auto School of America, Dept. M, 1600 Mich. Ave., Chicago. Tel. 1088 Cal.

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There's a big demand for automobile machinists and for men to do repair work in garages. Pay is good. Automobile Machinists' Course—In 48 weeks we teach you all about automobiles and make you a machinist. Chauffeurs' Course—in 12 weeks we teach you to drive and repair any car and to take charge of garage.
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RELIABLE AUTOMOBILE SCHOOL.
If you only want to learn to drive a car or to take a car to pieces or to clean up dirty parts, don't come to my school.
But if you want to learn the Automobile Construction in all its phases thoroughly, then come to the Reliable School.
THE F. E. EDWARDS' AUTOMOBILE SCHOOL,
1427 Wabash Ave., Chicago.

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A. L. DYKE'S AUTO INSTRUCTION—A new idea of instructing you to run and repair automobiles at home with working models (from London), charts, etc. Indorsed by Duryea, Oldfield, Splitdorf. Send for free 32-page illustrated and interesting book. A. L. Dyke, Box 16, Roe Bldg., St. Louis, Mo.

GAS ENGINE TROUBLES AND INSTALlation. Cloth, $1.00; flexible leather, $1.50. Automobile Troubles and How to Remedy Them. Cloth, $1.00; leather, $1.50. Ten other practical and reliable mechanical books. Send for circular.
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1128 S. Wabash Ave., Chicago.

NEW MICHIGAN ROAD MAP (LOWER peninsula). All the roads, lakes and streams. Price $1. John F. Nellist, 1955 Jefferson Ave., Grand Rapids, Mich.

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The motorcycle field is well worth your attention; 75,000 new machines in 1912. Leading medium. Motorcycle Illustrated, 51 Chambers St., New York City. Paid circulation over 8,600.

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AUTOMOBILE MAILING LISTS.

13,191	Automobile	Dealers	$25.00
9,627	"	Garages	20.00
5,681	"	Repairs	12.50
3,541	"	Supplies	10.00

Neatly typewritten, showing Financial Rating in dollars of each one, alphabetically by States and Towns, 1913 compilation.
Ask for certain States if you do not want all.
877,000 Automobile Owners, by States, Price on application.
Ask for our "Silent Salesman," showing 2,000 other lists, etc.
Send check with order.

TRADE CIRCULAR ADDRESSING CO.,
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Established 1880. Phone Franklin 1183.

AUTOMOBILE ADDRESSING AND MAILing lists; card systems; any section, any make. Auto List & Addressing Co., Buick Bldg., New York City, N. Y.

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NEW ENGLAND AUTO LIST AND TOURist includes weekly lists of all N. E. Auto Owners, Garages, Dealers, etc., with maps. Selected N. E. routes and motor news, $10.00 yearly. 138 Pearl St., Boston, Mass.

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HOTEL WYCHMERE, EUROPEAN,
Indiana Ave. and Eighteenth St., Chicago, in the very center of the automobile district; 75c to $1.50 per day; with bath, $1.00 to $2.00. Clean, comfortable rooms. Fine 40c table d'hote. Take South Side trolley to door.

CLEARING HOUSE

Continued from Following Page

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GUARANTEED FOR LIFE
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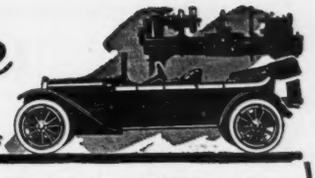
The Clearing House of the Motor Car Industry

For Second-hand Shop Equipment - Used Cars - Parts and Accessories



1" one time, $4.50; 2" one time, $8.75; 3" one time, $13; 4" one time, $16.75. Write for rates of larger spaces and longer terms.

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Quick-Knick

We want traveling salesmen to sell QUICK KNICK to garage men and car owners. QUICK KNICK deposits a beautiful, brilliant plate of nickel on brass auto trimmings. Just out. Ground floor proposition to live salesmen.

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Quality at a Minimum Cost
Every One Guaranteed

PULLMAN TIRE CO.
1268 Bedford Ave. Brooklyn, N. Y.
Dealers, write for agency proposition.

Times Square Auto Co.

1210 MICHIGAN AVE., CHICAGO

LARGEST DEALERS IN THE WORLD IN NEW AND USED AUTOMOBILES AND ACCESSORIES.

PROVERB: "It's an ill wind that blows no one good."
PHRASE: "One man's loss is another's gain."
PERTINENT: Now is your opportunity to turn these sayings into reality and to your benefit by taking advantage of the **MANUFACTURERS'**

Forced Clearance Sale!

It is the old story—the fellow with the ready money gets away with the pie.

NEW Automobiles—	Regular Price	Our Price
Guy Vaughan Chassis	$2,750	$1,250
Regal, 40 H. P., 7 passenger	1,750	885
Regal, 30 H. P., 5 passenger	1,250	685
Also absolutely new runabouts —several well known makes. (Names, by agreement, not publicly advertised, but given on application. Cars on our sales floors.)	1,395 & 1,250	885 & 690

Tops, Windshields, Speedometer, $65 Extra

If It's VALUE You Want, Don't Miss This
BEFORE DECIDING LOOK OVER OUR

USED CAR BARGAINS

FULL VALUE AND MORE IN EVERY OFFER

Hudson, 1912	$750
Peerless Roadster	750
Peerless Touring Car	900
Packard Foredoor Touring	850
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Stevens, 6 cyl.	400
King ($1,500 roadster), new	885
Oakland, 1912	500
Mitchell, 7 pass.	475
Royal Tourist	250
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NEW MOTORS, 2 and 4 cycles, $30 UP

BODIES:—Limousine, Coupe, also Delivery Bodies, all styles and sizes from $75 up.

TOPS—MAGNETOS—WINDSHIELDS—TIRES AND EVERYTHING FOR THE AUTOMOBILE AT ..... Cut Prices

Disco Self Starters THE RELIABLE ARTICLE, SPECIAL THIS WEEK, ONLY..... $40 $5

Send for our "Price Wrecker"
A Money Saver

Times Square Auto Co.

S.W. Cor B'way, 56th St. NEW YORK CITY
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and development of new ideas will receive our prompt attention. We have an entirely new equipment of turret lathes, broaching machines, worm and worm gear machines, lathes and other necessary tools, so that large contracts can be handled to advantage by us. Send blueprints or samples of articles you want manufactured, and we will give you figures on such articles, ready to ship.

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Send for our new catalogue before buying accessories. We guarantee lowest prices consistent with quality.

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Annular Ball Bearings REGROUND

We carry a complete stock of reground bearings of all makes and sizes, for immediate exchange.

Get Our Prices

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2640 Michigan Avenue
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All New 1913 Stock
Direct from leading tire manufacturers
WHILE THEY LAST

Size.	Casing.	Tubing.	Reliners.
28x3	$ 7.20	$1.90	$1.50
30x3	7.65	1.95	1.90
32x3	7.80	2.05	1.95
30x3½	11.00	2.70	2.60
32x3½	12.00	2.90	2.85
32x4	15.70	3.60	2.80
33x4	16.00	3.70	2.85
34x4	17.25	3.80	2.90
35x4	17.50	3.90	2.95

C. O. D. orders sent same day as received upon receipt of 10%, subject to your examination.

PARA AUTO TIRE CO.

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APCO——FORD SPECIALTIES

There Are Forty of Them
FREE CATALOG
AUTO PARTS CO. Providence, R. I.

Extra Strength U-KAN-PLATE

applied to brassy looking nickel plated trims makes the car look almost new. All brass parts are kept a bright silver color by simply using **Extra Strength "U-Kan-Plate"** as a polish and cleanser. Deposits pure silver. No mercury. No acids. **Agents wanted.** Quart cans $2, enough for car. Pint cans $1.25, of dealers or by parcel post. Sample can 10c. A. R. Justice Co., 619 Chestnut St., Philadelphia.

Automobile BODIES Wanted

Ford and other small fore-door touring bodies. Write us if you want to buy or sell any kind of automobile body.

PAUL MURRAY
Automobile Body Broker
518 Indiana Trust Bldg. Indianapolis, Indiana

Automobile Owners, ATTENTION!

THE TOBIN WHICHWAY SAFETY SIGNAL is a Combination Tail Lamp, Number Plate Illuminator and Safety Signal.

The word "STOP" ground in red glass is flashed automatically every time you slow up or stop your car, so as to signal the car in the rear of your intention, doing away with signaling with the arm.

The signals are made in black nickel, white nickel, or brass, and sold under a **positive guarantee of efficiency.** Money back if not satisfied. Price $7.50, complete, all ready for attachment to your car.

These signals may be secured at any Department Store or auto supply dealer or sent prepaid upon receipt of price.

Universal Signal & Supply Co.
12th Floor, Karpen Bldg. Chicago

Peerless Mohair Top Dressing

Waterproofs leaking mohair, duck and canvas. Makes old tops look like new.
1 gal.....$3.75 ½ gal.....$1.98
¼ gal.....$1.04

Peerless Leather Top Dressing

A renewer and preserver of all old rubber, leather and pantasote tops and curtains.
1 gal.....$3.50 ¼ gal.....$ .85
½ gal.....$1.85 ⅛ gal.....$ .51

Peerless Lining Dye

Makes a uniform black lining of all faded and stained linings of tops and curtains.
1 gal.....$3.00 ¼ gal.....$ .85
½ gal.....$1.60 ⅛ gal.....$ .45

Peerless Cushion Dressing

Brightens and renews all leather seats and cushions. Will not wash or rub off. Dries in twenty minutes.
1 gal.....$3.50 ¼ gal.....$ .98
½ gal.....$1.85 ⅛ gal.....$ .51

Peerless Extra Fine Black Japan

Air drying with a high gloss finish, on all metal parts. One coat covers solid.
1 gal.....$3.75 ¼ gal.....$1.04
½ gal.....$1.98 ⅛ gal.....$ .54

Ask your dealer and jobber, or send direct to us

The Columbus Varnish Company

COLUMBUS, OHIO

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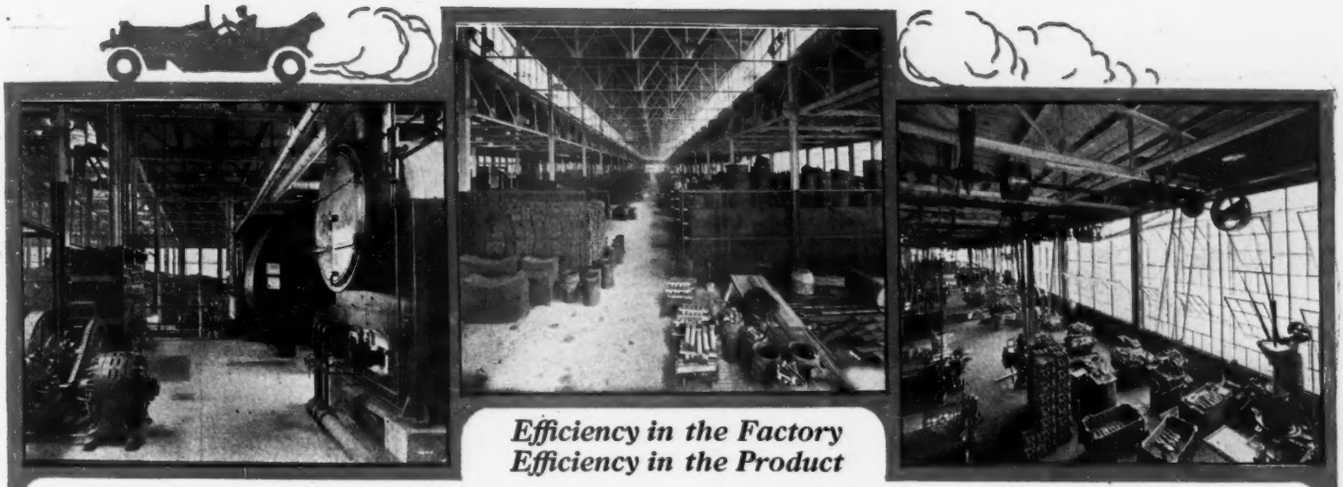

Efficiency in the Factory
Efficiency in the Product

GLIMPSES of the world's greatest lifting jack manufactory—a plant not surpassed in any industry for mechanical efficiency and ideal working conditions.

Duff-built jacks are recognized as the standard throughout the world—for great engineering projects, railroads, suburban and street railways and for all lighter requirements.

The same prestige that goes with our heaviest 500-ton hydraulic jacks attaches to our

GENUINE

BARRETT

AUTOMOBILE JACKS

The added creditability as well as the greater efficiency and safety of Barrett Jacks makes it tenfold worth while for the manufacturer to pay the slightly higher price of making it the standard equipment of his automobile product. With automobile buyers the Barrett is a *known* quantity of *known* quality. With dealers also who appreciate the value of offering standard accessories, the sale of a jack always means the sale of a Barrett.

Write for Catalogue and supply of literature.

THE DUFF MANUFACTURING COMPANY, PITTSBURGH, PA.

Established 1883

NEW YORK OFFICE: 50 CHURCH STREET

This is the 1914 Oldsmobile that so many dealers have been clamoring for

the Greatest Six-Cylinder Car Ever Produced

OUR entire sales organization, engineering department and factory managers not only endorse the statement that this is the greatest six-cylinder car ever produced, but insist upon advertising it as such. There is no other expression which so adequately and truthfully describes the new 1914 Oldsmobile Model 54.

We have never before in our sixteen years of automobile manufacturing made so strong a statement. Our policy has ever been, and will continue to be, a truthful adherence to facts, and when we commit ourselves we believe we can prove by demonstration or comparison that we have not underestimated the position occupied by Model 54 among sixes.

From the purchaser's viewpoint this 1914 Oldsmobile contains every feature of refinement, stability, luxury and power that can be found in cars of greater price.

From the dealer's angle it has back of all these features a reputation as solid and as old as the industry itself.

It is fair to state that there is not another six-cylinder car in America any better or wider known than the Oldsmobile.

It is not necessary to introduce the Oldsmobile. Olds Motor Works was founded in 1880, and after 34 years of successful manufacturing we celebrate anniversaries, not introductions.

You, who are familiar with motor car values, compare the 1914 Oldsmobile with higher priced cars and see for yourself if there is any reason why we should not be classed with the highest priced. Compare with cars of cheaper make and try to find an argument for not adding just a few dollars more in order to secure an Oldsmobile.

Dealers interested in six-cylinder cars have displayed a keener interest in the 1914 Oldsmobile than in any other model ever produced by the Olds Motor Works, and have unanimously pronounced it a supreme achievement among sixes.

The complete equipment on the Model 54 is the finest that money can buy.

Four or Five-Passenger Phaeton touring body type - - $2975
Seven-Passenger Touring Body, $175 extra. Limousine, $4300

Wire Wheels—Oldsmobile Trunks and Extra Tires at Additional Cost

TO RELIABLE DEALERS WE HAVE AN INTERESTING AND PROFITABLE MESSAGE

1914 DELIVERIES BEGIN AUGUST FIRST

OLDS MOTOR WORKS **Lansing, Michigan**